ORGAN INSTITUTE QUARTERLY

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★ ★ ★ EDITORIAL BRIEFS ★ ★ ★

THE fifth and sixth parts of the Silbermann book contain some of the most important technical details of his work. Although Silbermann's musical (tonal) practices were original to him (and we believe superior to those of his predecessors) and he also invented a number of mechanical improvements, it is interesting to note that he showed a marked preference for certain old-fashioned ways, so that some of his contemporaries considered him unprogressive. In this respect he was just like his great contemporary, Johann Sebastian Bach, whom he outlived by three years, and whose great innovation, equal temperament, Silbermann rejected.

Silbermann's treatment of the Pedal organ is interesting and an example of his independent thinking. He did not, in any but his largest organs, build a completely independent Pedal. It seemed satisfactory to him to give to the Pedal of his smaller organs just a few independent stops, usually a 16′ flue and a 16′ reed, an 8′ reed and an 8′ Octave, and to rely on a manual to pedal coupler. This coupler was usually permanently connected, or on, but could be disconnected by means of a Bassventil, a feature of all his organs that lacked a regular pedal coupler. This involved a second set of pallet valves for the bass notes of the main manual chest, operated by the pedals. Such a system presented the usual disadvantage of pedal tone that is in part coupled from a manual division (when a manual voice happens upon a note sounding simultaneously in the pedal part, it is not heard), and it may also have affected the speech and intonation of pipes that were thus momentarily receiving, from both valves together, more than their usual wind supply.

Another significant point for modern readers is the difficult problem of maintaining a light-touch key action while providing each note channel with an adequate wind supply for full combinations. Larger channels and valves, delivered more copious wind but also resulted in more resistance from the chest wind and stronger valve springs, which was felt in the keys; with smaller channels valves pipes robbed each other of wind in full combinations, producing out-of-tuneness. It was to avoid this robbing and the differences between the speech and tone of pipes used separately and in combination, that Casparini and other builders experimented with wind chests incorporating an individual wind supply for every pipe. These over-elaborate mechanisms were costly and difficult to maintain in good order, and also failed to completely eliminate the defects. As we read in the story, sobbing and wheezing in full organ was a generally accepted fault of even the best instruments in those great days of the organ. Would it be "generally acceptable" to modern ears?

AMONG THE MANY LETTERS AND OTHER EXPRESSIONS OF APPRECIATION THAT HAVE been received by the Organ Institute perhaps the most gratifying are those that come from English readers of the Quarterly. Since we imported most of our original church music from England, from whence most of us trace our immediate musical ancestry, we have felt a certain regret that recent development of American organ music and organ building, as well as our entire practice of church music, has preceded along lines so sharply divergent from the course of similar events there. In the United States many English importations have been discarded, among them fat diapasons and tubas, together

with that strong predilection for what now seems to be excessive foundation tone, and the numerous Hope-Jones aberrations. We have also turned our attention away from music of the English Cathedral School, all in favor of ideas and materials from more distant times and places.

While we were practicing this eclecticism, which we regard as a fundamental American tradition, it has appeared to us that our English cousins may have remained too firmly wedded to their own established tastes and practices, and, consequently, cut themselves off from the great enrichment that has manifested itself so widely in the past generation, both here and on the continent of Europe.

The storm of criticism that has greeted the new Royal Festival Hall organ sounds like an echo (by no means faint!) of the vigorous protests against organ reform heard in this country during the late, but not lamented, so-called "baroque" controversy. But the very fact that this new organ has been built in England re-establishes common channels of musical thought and experience on both sides of the Atlantic. It contains one hundred and three stops, five manual divisions on four manuals, is voiced on moderate wind pressures (2 3/4" to 4 1/2"), and is installed in a free-standing position across the wide front wall so as to provide ample speaking room around the pipes and the maximum of opening for the passage of tone. Its stoplist shows a clear attempt to achieve balance between foundation tone and upper work, every division having some mixtures and independent mutations, so that all the pitches are represented. It was designed by Ralph Downes, organist of the Brompton Oratory, who is well known and admired in this country because of the beautiful concerts he played here while organist of Princeton University Chapel.

A divisive factor in Anglo-American organ matters has been the comments of such English visitors to our shores as Henry Willis, who is likely to say "even in America" an organ feature of which he disapproves is unacceptable, as though it was quite generally recognized that there is a complete absence of taste here! (He once submitted an article for publication in this magazine which contained these very words.) But now, happily, we hear comments like: "The Organ Institue Quarterly is the finest publication devoted to the organ in any language." - - - - "We must look to the United States for leadership in these matters," and "The Organ Institute Quarterly is of the utmost interest and value to me," from such outstanding English musicians and authorities as Dr. W. L. Sumner, of Nottingham University, and Cecil Clutton, well-known writer on the organ, respectively, together with similar expressions from many other Englishmen, which we prize very highly.

One of the most significant recent events in the English Organ World was the publication of the book *The Organ*, by Cecil Clutton and George Dixon (Grenville; United States agent, Homeyer). This book attempts to fairly appraise the values of various continental organ schools, including the work of Schnitger, Silbermann, Cavaillé-Coll and others. These chapters are given equal status with a general history of the last century of English organ building in such an impartial, unprejudiced manner as to lead the thoughtful reader to the conclusion that incorporation of at least some of their several virtues into the modern organ might well be attempted. There are also some interesting and valuable comments on the art of registration. The book mentions two American organs, at Groton School and at the Busch-Reisinger Museum, and their stop lists are given. They are reported as "very good" by hearsay only, although the Groton organ is critized for its lack of a Tuba! On this side of the Atlantic we seem to have run out of uses for Tubas. (The new State Trumpet at the New York Cathedral of St. John the Divine is

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supposed to be used to herald, with fanfares, the approach of a bishop, or a temporal ruler.) American readers will find this book a worthwhile addition to their libraries.

The late Colonel Dixon exercised wide and beneficial influence in English organ building. His younger collaborator, Cecil Clutton, and many of the younger organists, are establishing their progressive outlook and constantly gaining new support for the organ reform. We are delighted to make common cause with our colleagues in England for the advancement of organs and organ music.

READERS, ADVERTISERS, FORMER STUDENTS, Associates and all friends of the Organ Institute: please be informed of the fact that your interest and support are warmly appreciated. The cordial reception that has been given to our various offerings and the enthusiastic comments which we have received from all parts of the world have encouraged us to think about some very interesting future developments. However, the conduct of our present program is a very costly undertaking; the highest musical and journalistic standards are not easily maintained with an economy budget. The Organ Institute is operated by a non-profit corporation, and its activities are intended to be of benefit to the entire organ profession. They are planned impartially, without prejudice for or against any school of thought in any area of music; our teachers and authors frequently disagree with each other. Because of the breadth of our general purposes and the scope of our program we are now seeking broader and more general support. At the present time we would like to have: more subscriptions, more advertisements, more registrations, and more contributions, even, in fact, an outright subsidy. *Your* help and suggestions are solicited.

(Entered as second class matter at Andover, Massachusetts)

BRIEFS ★ ★ ★

A PROJECT THAT HAS OFTEN BEEN SUGgested and is now under consideration is an educational all-expense tour of famous old European organs, in which the Organ Institute would make arrangements for the examination and use of outstanding examples in several countries, representing various schools. The visits could be long enough to include, in addition to concerts, a study of the virtues of each instrument in the performance of various kinds of music. Attendance at one or more of the music festivals and incidental sight-seeing could be included also. We are now in a position to carry out such a plan in the summer of 1955 if there seems to be widespread interest in it.

IN ROBERT NOEHREN'S EXCELLENT ARticle published in our Spring Issue the statement about mouth widths appearing under the dimensions of C pipes mentioned as typical of Schnitger Principals on page 19 was added to the article, with Mr. Noehren's consent, by the editor, who considered the point to be a matter of some interest. It is entirely the editor's fault, therefore, that the word "diameter" was inadvertently used instead of "circumference." It should have been printed thus: "Mouth widths are usually one-quarter of the *circumference.*" The editor has derived some consolation from the fact that several organ builders, who would have been most likely to have seen this error, reported that they read right through without noticing it. Circumference and diameter being functions of each other, it is easy and by no means uncommon to substitute one word for the other in such discussions.

Mr. Noehren also reports that the Jakobikirche organ at Hamburg received its carved head stop knobs very recently, in the restoration after World War II.

ROBERT NOEHREN

UNIVERSITY OF MICHIGAN

ORGAN INSTITUTE

The Organ Institute is a non-profit corporation and cordially invites all persons interested in sponsoring its program to become Associates by contributing any sum, however large or small, to its scholarship fund.

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RUSSELL HANCOCK MILES PRESENTS his point of view on the performance of Bach's organ music, with especial reference to the suggestions made in the Winter Issue of the Quarterly by Gilman Chase. Musicologists and historians have brought to light many interesting features of musical performance practices of earlier times. It is important to notice, however, that although there is general agreement that these traditions should be studied and reestablished, musicians are by no means in agreement about their application. Some feel that we should employ rubato, rhythmic alterations and other interpretive devices much of the time, while others believe that these features should be reserved for certain types of movements and passages.

Our Summer Session announcement suggested three books for students' background reading. Each of them were immediately criticized by various correspondents who disagree with some material in one or more of them. These critics are well-informed, sound scholars and musicians, whose opinions are entitled to the highest respect. The truth of the matter is that there is not yet any completely authoritative work on all aspects of seventeenth- and eighteenth-century musical traditions.

J. R. KNOTT, WHO HAS LONG CHAMPIONED the modern Danish organ in England, has given us a comprehensive survey of contemporary trends and practices in that country where the organ reform is well advanced. We are grateful to him, and hope that we have not misspelled the names of places and stops!

ISA MCILWRAITH'S FINE ACCOUNT OF Germany proved to be too long to fit into this issue. The second and concluding portion will appear in the Autumn Issue. She, herself, however, will appear in Andover at our Summer Session, where she will give us more details and show pictures of her trip in an illustrated lecture.

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HOMER G. MOWE

VOICE FUNDAMENTALS IN RELATION TO CHORAL SINGING

ONE of the basic problems constantly confronting the choral conductor and the choir director is the limitations and imperfections of the instruments he must utilize — the voices of the singers. The music he selects will surely require some vocal range, some control of dynamics, an ability to sustain phrases of considerable length, and, most essential of all, a quality of tone that is pleasing to the ears of listeners and capable of sufficient variation to convey the emotional mood of the composition. To these requirements must be added the ability to convey clearly the text.

Unless the director is in the fortunate position of having trained voices, he will realize that the vocal instruments at his command are lacking in the ability to fulfill most of these requirements. This problem is of vital importance to every conductor, not only for attainment of good and constantly improving performances, but also to accomplish the ideal of gradual development of the voices in his chorus through participation in group singing.

A discussion of the problem should begin with some basic facts about voice. We use the term "voice" in referring to the sound resulting from the action of the vocal organs. These start functioning at birth, instinctively and without training, as do other organs of the body, the lungs, eyes, ears, et cetera. The child must acquire language from outside himself. He must also acquire music. But voice is born in him, as any parent can testify! It is this basic human sound, or noise, that will be modified by language and used by the individual all his life in speech and in singing.

As all human beings are constructed, basically, according to the same pattern, it is logical that there are certain natural laws governing the use of all voices, just as there are laws governing the functioning of other bodily organs and parts. Some years ago the American Academy of Teachers of Singing issued a paper entitled "Some Principles in the Care and Development of the Human Voice from Childhood through Adolescence to Maturity," which presented the beliefs of its members on this important subject. The National Association of Teachers of Singing, in 1946, published a paper on "Training the Vocal Instrument," a statement of laws and precepts upon which vocal pedagogy may be based. (These papers are available on request.) The leading teachers, therefore, agree that voices will improve only as the individual conforms to the natural laws governing voice use.

Attention to such fundamentals as correct posture, position of the vocal organs, coordination of the body (which includes breathing), and mental and emotional attitude is essential if singing is to be improved. And even a slight improvement in any of these areas will bring about a corresponding improvement in the singing of any individual. These are the *causes* behind the *result*, which is the tone and the ability to control it. These are, in short, *principles*.

It will be of real value to anyone dealing with voices to have clearly in mind the difference between *principles* and *methods*. Principles are unchanging. They apply to everyone. Methods and devices are simply the means used to lead the singer into conformity with principles. Principles are few. Methods and devices are numberless. While

it is essential that there be an agreement on principles, methods may vary widely as long as they lead to a successful result. They are in no way sacred. Most of the apparent disagreement among teachers of singing lies in the field of methods and not in the realm of principles.

The Spring, 1954, issue of the Organ Institute Quarterly contained an article by Arthur Howes, giving some excellent advice on vocal fundamentals and on materials for practice. It is unnecessary to add to his suggestions about breathing, posture, et cetera. It might be of practical interest, however, to refer to and discuss, briefly, some problems found in another area — that of the use of language in singing, as this can so greatly affect the position and functioning of the vocal organs, and hence, the resultant tone.

To review a few facts — language is made up of words, and words are composed of two elements, vowels and consonants. Tone (vocal vibration) is sustained on the vowels. Most consonants interrupt the tone, the exceptions being the so-called vocal consonants. The vowel should be considered as a modification of the basic tone, which should retain all its other characteristics through any series of vowel changes.

It will be found that in the cases of most young singers in a choral group, habits of vowel formation are in conflict with the maintenance of the throat position required for good tone. The laryngeal and oral cavities of the pharynx, where vowels are properly formed and resonated, must not be disturbed by the actions involved in vowel formation or the resultant tone will be correspondingly distorted. When one considers the great number of vowel changes, to say nothing of consonant interruptions of tone, in a single phrase, the aggregate effect of even a small distortion on each vowel becomes apparent.

There are many exercises and devices being used to remedy this defect. Behind them all lie several basic considerations which need to be kept in mind. We are told that a singer must be able to produce and sustain a pure vowel sound, unchanged throughout the duration of the note. This accomplishment demands an unchanged position of all the parts involved in producing the tone for that length of time. In ordinary conversation this ability is seldom required, nor is it present. Our careless habits of speech, and especially the use of changing vowels, so prevalent in our American speech, render the acquisition of the singing form more difficult than it would be in some other languages, notably Italian.

As an illustration, take the first four words in the well-known and always lovely song, "Drink to me only with thine eyes." Good singing demands this treatment: "drIH —nk tOO—mEE—OH—nIIH," each vowel being sustained without any alterations. The habits of untrained singers turn this phrase into something like: "drIH—uh - nk tOO—uh - mEE—uh - OH—oonlEE—uh." Another common fault, that of sounding the consonants too soon, intensifies the distortion.

Another requirement is that the position for the first vowel to be sung should be prepared *before inhalation*, and the positions for all succeeding vowels be prepared before tone is made. Also the movements necessary in forming the initial or intervening consonants must be accomplished without disturbing the required position for the tone or the vowel. Most tones are sustained for a very short time and unless singers start the tone with the vowel position already formed they will not have time to find it in the few seconds allotted to the note or syllable.

One further consideration is that pitch must be clearly and strongly willed before tone is started. The urge to make tone is usually so strong that tone is begun slightly before the vocal cords have adjusted themselves to produce the required pitch. Directors

may well find in these rules a cure for much blurred diction, scooping on attack, and off-pitch singing.

Methods and devices for applying these rules are many, and new ones are constantly being created to fit new situations. No one method will be effective in every case, but the simpler and more basic the approach, the greater its effectiveness. The musical material utilized should be simple enough so that it offers no added difficulties. In the first stages of voice training, music having step-by-step progressions, with few or no long intervals, is best. Chanting is excellent material for the acquisition of correct vocal habits. It can even be simplified to the extent of chanting the text of any composition on one pitch. By this means the habit of preparing the vowel form (physically) and the pitch (mentally), the habit of sustaining evenly both the power of the tone and the purity of the vowel, and the habit of clear, strong sounding of all consonants, can be acquired without the added difficulty of pitch change. Then by moving the pitch up or down for each succeeding phrase of the text, a start can be made toward the inclusion of the melodic line while still practicing correct vocal habits.

The objective of voice training is, of course, the complete development of the voice of the singer and the acquisition of such skill in its use that the singer may realize the dictum of the late William Henderson, that "singing is the interpretation of text by means of musical sounds produced by the human voice." A pianist would not willingly perform on a poor piano, for his playing skill would accomplish little. A singer ought not to be satisfied with a poor voice. The pianist can purchase a good instrument. The singer must labor within himself to develop one. It can be done, however. Young singers usually find their first opportunities in choirs and choruses. The help given them by the director who has an understanding of voice fundamentals can be invaluable to them, and assist in bringing into their lives the great joys and values to be derived from good singing.

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* * * A MATTER OF RECORDS * * *

THOMAS P. FROST

OUR survey of the components of a phonograph system began with the record player last issue. Directly associated with the player are the stylus (needle) and cartridge (pick-up), which we can now take up briefly. The preferable material for an LP stylus is diamond. Sapphire is also used, but is generally false economy because it wears out so much faster. (Fifty or so playings are considered the useful life of a sapphire needle, while diamond will last almost indefinitely.) With sapphire there is also greater danger that records will be damaged by a worn needle. Even a slightly worn needle can cause irreparable damage to a good record, and the needle may wear before it is suspected.

Two different sizes of stylus are required, a wide-tipped one for standard records (78 r.p.m.), and a finer one for microgroove (33, 45, and a very few 78's). Universal needles have been developed which will play both types of discs after a fashion, but they are not recommended for fidelity.

A chain is no stronger than its weakest link, and the "weakest link" of many a phonograph is the cartridge. The cartridge, or "pick-up" is the sensing device which holds the stylus, at the end of the tone arm. It generates a minute electrical voltage, which fluctuates in exact correspondence with the stylus' motion. (This tiny voltage is applied to the amplifier, and from thence to the loudspeaker.) The crystal cartridge particularly, which was practically universal until recent years, is inadequate for the requirements of high fidelity sound. The fluctuating voltage it generates does not follow precisely enough the motion of the needle. With a crystal of any ordinary sort it is not possible to reproduce the full audible frequency range, nor to obtain smooth treble response.

The "variable reluctance" cartridge, generating its voltage on a magnetic principle, is far more satisfactory. It will produce much truer fidelity, and at the same time reject more of the surface hiss from a record. Several other kinds of pick-ups have also been developed, including ones with ceramic, variable resistance, and variable capacitance elements. Variable reluctance cartridges are the most widely used, however we find General Electric units very satisfactory.

Fortunately for those with older phonographs, it is often possible to replace a crystal with a new variable reluctance cartridge at moderate cost. When this is done, a preamplifier also must be added, to build up the minute voltage from the magnetic pick-up to equal the stronger output of the crystal.

It is important that the weight of the tone-arm be as light as possible, to reduce record wear to a minimum. Most old crystal pick-ups used pressures which are exceedingly heavy by today's standards. Modern pick-ups are designed for operation at pressures of only 6 to 8 grams (about a quarter of an ounce) and sometimes less. Treasured records deserve a good needle, played at a gentle pressure.

A word of caution: the needle should be cleaned of dust frequently, and no particles allowed to accumulate between the stylus and cartridge. Even a little dust can interfere seriously with the quality of the sound.

A final observation on the subject of cartridges may be of value. "Turnover" cartridges, having two needles, are available. There are stigmatized by the inherent disadvantages that the stylus may not be held rigidly in position, and that they facilitate damaging a record with the wrong size needle.

We must save for next issue the extremely interesting subjects of amplifiers and treble and bass compensation. Also, we will be glad to answer readers' questions concerning high-fidelity recordings or sound . Now, on to the records:

JULIUS REUBKE, "Sonata in C Minor on the 94th Psalm"; FRANZ LISZT, "Fantasia and Fugue on B A C H"; "Gloria and Credo" from an organ mass. E. POWER BIGGS, organ. COLUMBIA ML 4820 12" LP. $5.45.

Of all the organs the writer has been privileged to hear, none has a more distinctive personality than the Methuen organ, and none has proven more consistently satisfying than this masterpiece of the organbuilder's art. Through the miracle of recordings, it is now possible to hear this organ wherever there is a good phonograph, by merely playing the present recording. We are indebted to Mr. Biggs for a brilliant performance, and to Columbia for a record of outstanding technical excellence. The record is unusually realistic in effect, with very clean quality, virtually imperceptible distortion, and very quiet surfaces. Many will prize it because it can so convincingly re-create the impressively rich sonority of this unique instrument in its reverberant setting. The entire gamut from the ponderous roll of the 32's to the altissimo sparkle of the highest mixture, and the dynamic range from tutti to pianissimo are faithfully preserved.

Columbia's engineers have either learned not to diddle with the volume, or else have discovered how to do it without disturbing the music. Only at one point (immediately following the first forte in the Reubke) do we sense a dubious volume adjustment. They have also taken pains to eliminate the sound of the stop-action. It can still occasionally be detected, but is never obstrusive. Our only real complaint, in fact, concerns a minor point: one tape splice near the conclusion of the Reubke fantasia seems to interrupt slightly the progress of the music. (This, we think, is because the reverberation from the preceding chords is abruptly cut at the splice, and perhaps because the next chord enters an instant out of time.) This scarcely mars the quality of this otherwise outstanding disc.

We hope that Mr. Biggs and Columbia will collaborate on many more recordings at Methuen, for by means of them the recorded organ literature will be enriched, and the Methuen organ will gain increased fame and recognition as one of the outstanding instruments of the world. The organ has been too little heard, shut away from the public for generations until its recent restoration; and even today too few know of it. It is difficult to overestimate the historical significance of this instrument. Installed in the Boston Music Hall in 1863, it was then the largest and finest organ in the United States. For years, it served as an example and an inspiration to American organbuilding.

We are grateful to Mr. Biggs for his jacket notes giving a very complete history of the organ's first period, as well as its present stoplist. Built by the still-famous German firm of Walcker, it stood in the Music Hall until 1884, when it had to make way for the new Boston Symphony Orchestra. Subsequently it was purchased by Mr. Edward F. Searles, who built the present hall, moved and rebuilt the organ, and reopened it in 1909.

Although its rebuildings are not discussed in the jacket notes, it should be realized that the organ today is by no means a Walcker instrument of 1863, having been much modified in later years. In the Searles rebuilding a new console was added and new

sliderchests were installed throughout.

In the 1947 rebuilding, by Aeolian-Skinner, the organ assumed its present disposition and personality. The organ now is a composite, containing outstanding work of two of the world's most famous organbuilders. Most of the original Walcker pipes have been retained, and they give the organ a massive effect rarely approached in contemporary instruments. Certain shortcomings of Walcker's work have been corrected, notably the chorus reeds, which were reportedly very hoarse; the upperwork has been increased in both quantity and quality; and the separate divisions have been moulded into distinctive and characteristic ensembles.

The "straight" pedal is undoubtedly the largest in the country, having thirty ranks with neither a borrow nor an extension. The three 32′ voices are original Walcker work. The 32′ Open is made of burnished tin, standing impressively in the case from low F. The 32′ Contre Bombarde has unusual free-reed pipes, with full-length wooden resonators. Its full, rather smooth tone, rich in lower harmonics, is frequently useful. The 32′ Cornet IV, consisting of flute pipes sounding harmonics of the 32′, produces a strong, prompt 32′ tone. It reproduces well on the phonograph, as the present record shows. Of the seven 16′ Pedal ranks, four are Walcker, and three new. Portions of the Pedal upperwork are also new, including the Mixtur VI and the 2′ reed.

The Great organ was enlarged to a monumental thirty-five ranks. Its Principal chorus 8′ through 2′ is new, and the mixtures are revoiced or new. The entire division is free-standing in the hall, which aids it immeasurably, for the tone is heard without obstruction. It affords a wealth of effects, including some of the most magnificent low-pressure flue ensembles ever voiced.

New stops in the Swell include the broad strings, mixtures and reeds. The 8′ and 4′ Harrison Trompettes are fiery, but less forced and edgy than many examples; hence they combine well with the flues. They can color any combination, but do not dominate the Great. The biggest ensembles of this organ are consequently essentially foundations-and-mixtures. This is probably the most potent and most brilliant organ anywhere of which this is true.

The large Positiv is by Aeolian-Skinner on the classic model, with a complete array of foundation and mutation voices, topped by two silvery mixtures. It is composed of new pipes standing on the chests of the former Choir organ, and has a particularly characteristic tone, partially resulting from the prominent twelfth in the tenor and middle registers of both the 8′ foundation stops and the 2 2/3′ Nasard.

The enclosed Choir occupies the chests formerly belonging the Solo, which has been dispossessed. Its new Krummhorn appears with particularly colorful effect in the Reubke. Mr. Biggs shows us little or nothing of the 16′ Dulzian or 4′ Regal, which is unfortunate since they are also capable of delightful and fascinating effects.

The music on this disc is largely familiar. The Reubke Sonata is so well known as to require little mention here. Those who like it for its dramatic and brilliant qualities will care little that its most striking passages were derived from Liszt's Fantasia and Fugue on "Ad nos, ad salutarem undam," or that many of the brilliant manual passages are pianistic. Conversely, those who hold it in low esteem because of its bombastic and diffuse nature will be unimpressed by its sweep and imaginative power, or the influence it had on the composition of program music for organ. While the present writer is aware of shortcomings in this sonata, he is bound in candor to confess that an early fascination for it has left a spell which has never worn off. Thus it is that we listen to it with en-

joyment, if no longer with the old confidence that we are being transported to music's supreme heights.

The sonata, virtually a symphonic poem for organ, consists of one continuous movement based upon a single theme which undergoes Lisztian metamorphoses. It is divided into three sections, a fantasia, an adagio, and a very free fugue. It follows a program taken from the 94th Psalm, vv 1-7, 17-19, and 22-23, whose moods it vividly illustrates. However, there are also incongruous galloping passages, and martial effects more likely to conjure up the Kaiser's legions than the Psalmist's Jehovah.

It has been rumored of Mr. Biggs that the "E" stands for "Electric"! In any event, *electric* is the word for his dashing performance of this difficult sonata. His registrations throughout are suitable, although we might ask for greater variety in selection of ensembles; and his realization of the fugue particularly is dramatic and intense. The fantasia is more slowly paced than his pre-war recording, perhaps to take advantage of the live acoustics of the Methuen hall. The launching into a more deliberate tempo at the decrescendo leading to the adagio section is a departure from the earlier interpretation. It creates a momentary hiatus as well as a marked but over-pompous conclusion to the fantasia.

The Liszt Fantasia and Fugue B A C H is not generally held to be among his finest works. Seemingly an extended brilliant improvisation, it bears many earmarks of parentage at the hands of a virtuoso performer who wanted first and foremost to make a big impression by making a big noise. In this, Liszt has unquestionably succeeded. His brain-child is by turns bombastic, pianistic, halting, and superficial. Both movements come to strangely inconclusive ends. Mr. Biggs makes the most of the opportunities it affords him for display and color, and it sounds as though he were having a delightful time. He almost persuades us that the work does more than prove that the organ has got leather lungs.

The little pieces from the Liszt organ mass which fill out the record's second side are not so familiar. Written in a halting style which brings to mind the endless pausings of the preceding fantasia and fugue, they sound occasionally like a search for the right stop-knob or the right note. However, they have moments of lovely melodic invention, particularly in the Credo, once the initial forte has been passed. Also, they are free of the bombast and pianistic tendencies which so plague the B A C H. It seems a pity that more movements from the same mass could not have filled the blank inner portion of the record.

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J. R. KNOTT

AN INTRODUCTION TO THE MODERN DANISH ORGAN

IN accepting the Editor's invitation to prepare this essay, the writer wishes to emphasize that the views presented are personal ones and do not necessarily imply that similar views are widely held in Great Britain.

Secondly, the essayist lays no claim to be an authority. His only claim is that he has been a student of the organ for thirty years, in which time he has studied organs in all parts of Great Britain, the Continent, and Scandinavia.

Thirdly, it is assumed that American readers have read and assimilated the many articles which have been published in recent issues of the Organ Institute Quarterly and The Diapason which have dealt with such matters as slider or sliderless soundboards, the work of Gottfried Silbermann, and so forth.

Historically, the early Danish organs differed little, if at all, from the typical German organs of the period. Indeed, organs in Denmark were built by German masters working under "Royal Privilege." This usually meant that a German organ builder, having been commissioned to build one organ, usually received other commissions whereby he remained in Denmark.

It is a fortunate circumstance that, in spite of the vandalism widely practiced on these organs during the nineteenth and early years of the twentieth centuries, a few (very few) old organs remain today in good playing order, from whose old pipework it is possible to obtain a reasonable idea of the organ tone of the period. There remain also several fine organ cases by such masters as Maas (1600-1615), Lorentz (1615-1650), Frietsch (1655-1659), and Johannes and Peter Petersen-Botzen (1674-1719).

We will refer in more detail to the work of Raphaelis (Roskilde Cathedral), Compenius (Frederiksborg Castle) and Carsten (Aarhus Cathedral).

Again, prior to 1939, there were many organs in North Germany which had undergone few tonal changes and were in good playing order, from which additional evidence of the tonal qualities of the old organs could be adduced.

It is with a background of hearing and playing many of these organs that the writer approaches the study of the modern Danish organ.

A period of decadence in organ design and organ playing developed after the departure from the traditional concept of the organ, following the "freedom" which pneumatic action gave to the organ builder. Such freedom and mechanical ingenuity were paid for by the loss of true pipe intonation and the ability to phrase adequately in performance.

It is not the purpose of this article to discuss the pros and cons of the slider soundboard versus the sliderless chest. Many others, well qualified, have argued these, and will continue to do so.

A word on pipe intonation is, however, called for.

No one will, I am sure, oppose the view that, ideally, every pipe in an organ should be voiced in the church and in the position inside the organ from which it will be heard: a long and patient work for the artist. The skilled voicer can and does do a lot of such work at the voicing machine in the shop, but careful finishing must be done in the church.

For a moment, let us consider three examples of old work.

(1) Frederiksborg Castle (not the chapel organ)

(2) Roskilde Cathedral.

(3) Aarhus Cathedral.

The first is a "house" organ, and as such it must be studied. The organ is not designed as a church organ (presupposing a larger building), and so its scaling and pipe intonations are akin to its surroundings.

There is controversy or misunderstanding about this organ. The historical facts, as corroborated by a Danish organ builder who knows the organ intimately, are as follows:

The organ was built by Compenius as a house organ for the Duke of Braunschweig-Wolfenbüttel, Henrich Julius, in 1609. There is a note inside the organ which gives 1609 as the date when the organ was finished, and at the bottom is written: "Anno 1610, the 7th September, E. C. fecit." There is another note in the organ with the date: "1616." Photographic copies of these notes are in the possession of Mr. Paul Gerh-Andersen.

This Compenius organ was presented to King Christian IV after the death of its owner, and it was circa 1616 when the organ was removed to Frederiksborg Castle.

Compenius supervised the reerection, but did not survive to witness the completion. Although Praetorius, in his *Syntagma Musicum* mentions the year 1612, there can be little doubt about the dates left in the organ, in places where such notes could only have been put at a time of construction or reconstruction.

Nevertheless, the stoplist, as recorded by Praetorius, is the same as found on the organ.

Manual I (lower)	*Manual* II (upper)	*Pedal*
8′ Quintadena	8′ Principal	16′ Grosser Gedactfloiten B.
4′ Klein Gedactfloite	4′ Klein Principal	8′ Gemshorn B.
2′ Super Gemshornlein	8′ Gedactefloite	8′ Quintadeen B.
Nasatt	4′ Gemshorn	4′ Querfloiten B.
Klein repetirt Zimbel	4′ Nachthorn	2′ Nachthorn B.
4′ Principal Discant	4′ Blockpfeiffen	1′ Bawrfloiten Basslein
4′ Blockpfeiffen Discant	3′ Gedacktquint	16′ Sordunen B.
8′ Krumbhorn	2′ Supergedactfloitlin	8′ Doltzian B.
4′ Geigendregal	16′ Rancket	4′ Jungfrawen Regal Bass

Examination of the construction and interior work provides evidence that some changes were wrought subsequent to the original building, and as the stoplist (and presumably the pipework) is identical with the record of 1612, it may be argued that Compenius and Praetorius together undertook some alterations to the organ between 1609 and 1616.

For a complete history of this remarkable instrument, the reader is referred to Monograph 16, Joseph Worsching, *Die Compenius Orgel auf Schloss Frederiksborg.*

The second example of old work is now part of the great instrument in Roskilde Cathedral. Raphaelis was commissioned to build an organ for the Cathedral, and it was completed in 1555. Thanks to the reverent attitude of successive custodians and restorers, there are preserved today the original soundboards of the Ruckpositiv and nine speaking stops. The original 27 speaking stops were preserved unchanged for nearly 300 years. Not till 1833 was this organ reconstructed.

RAPHAELIS 1555 — MARCUSSEN & REUTER 1833 — FROBENIUS 1926

Hauptwerk	*Oberwerk*	*Pedal*
16′ Principal	8′ Fugara	32′ Bordun
16′ Bordun	8′ Unda Maris	16′ Principal
8′ Principal	8′ Gedackt	16′ Gedackt
8′ Bordun	8′ Quintaton	16′ Subbass
8′ Spitzflöte	4′ Suavial	16′ Salicet
8′ Hohlflöte	4′ Flöte	8′ Principal
8′ Gambe	2 2/3′ Nazard	8′ Gedackt
4′ Octave	2′ Flageolet	8′ Cello
4′ Quintaton	1 3/5′ Terz	8′ Spillflöte
4′ Spitzflöte	1 1/3′ Larigot	5 1/3′ Quinte
2 2/3′ Quinte	1′ Sifflöte	4′ Octave
2′ Superoctave	8′ Dulcian	4′ Nachthorne
IV Mixtur	*Ruckpositiv (*)*	3 1/5′ Terz
III Cornet	8′ Principal	2′ Flöte
1 1/3′ and 1′ Rausch-quinte	8′ Rohrflöte	16′ Bombard
16′ Fagot	4′ Rohrflöte	8′ Trompete
8′ Trompete	4′ Fugara	4′ Corno
4′ Zinke	2′ Octave	
	2 2/3′ and 1 3/5′ Ses-quialter	
	III Zymbel	
	1′ Superoctave	
	8′ Regal	

(*) Original Raphaelis soundboard and pipework from 1555. Slider soundboards throughout the organ. Action partly tracker and partly a combination of tracker and pneumatic. Pneumatic drawstop action.

The third example retains to this day 22 speaking stops from the original Carsten organ dating from circa 1721. (This organ was rebuilt in 1927 with 88 speaking stops.)

Before passing to the question as to how and when did the "Modern Danish Organ" begin, I should like to refer to other matters of fact which are germane to the real appreciation of organs in Denmark and Germany during the period 1555 to 1744.

Some contemporaries claim that these old organs were poorly constructed, mechanically cumbersome, and generally in poor playing condition by the time J. S. Bach came on the scene. However, Buxtehude (1637-1707) enjoyed a reputation for organ composition and playing, confirmed by Bach's long trek to hear such organ-playing. There is ample evidence that organists of the period (such as Buxtehude, Pachelbel, Scheidt, and Bach) were frequently engaged to advise and report on the condition of organs, to approve organ builders' proposals, and, finally, to examine the new organs or the repairs in order to ensure that everything had been properly carried out. (It is still part of Scandinavian organists' qualifications to keep an organ in tune and to attend to all minor adjustments to action, and so forth.)

In view of the above, is it logical to think that the organs of the period were manifestly unstable as to construction and maintenance?

I have endeavored to establish sufficient data about old Danish organs to enable the reader to journey with me on an examination of the new ones.

Once again, all evidence shows that Danish organ builders were inspired by what went on in Germany; and so, when, in the years following the 1914-1918 war, organists and musicologists in Germany began to express their doubts about the capabilities of contemporary organs as vehicles for the performance and interpretation of sixteenth-, seventeenth- and eighteenth-century organ music, considerable interest was shown in the facsimile organ built by the late Dr. Oskar Walcker for Freiberg University in 1921 to the specifications left by Praetorius. The experience of hearing organ music played on this instrument stimulated interest, and the "Orgel-Bewegung" in Germany was founded.

A similar movement took place in Denmark, and I hope I am not being unfair in saying that only two Danish firms sought to improve the "King of Instruments" by eradicating bad features that had crept into organ design and construction.

Surely, although the Danish builders, Marcussen & Sons of Aabenraa, and Th. Frobenius & Co., of Kgs. Lyngby, may have been inspired by the "Ogel-Bewegung," they were not imitators and did not attempt to re-create the organs of Schnitger or Silbermann. They sought, instead, to confirm their empirical knowledge by scientific investigation, to design works of art which were logical developments of the earlier organs and modern in construction, and to provide organists with instruments restful to sit at, intimate in action, and capable of producing a clarity of line in all contrapuntal music. The student soon observes that the Danish movement went its own way.

It must not be imagined that the path of the pioneer reformers was easy. Far from it. Many old, established builders and many organists were violently opposed to the new principles being worked out. By 1936, however, most opposition had been vanquished both by debate and through the acceptance of the new organs by more and more organists.

It may be true to say that up till 1943, when the opposition was finally beaten in debate, Danish organ development was following two paths. One path followed the ideas of Dr. Schweitzer and seemed to regard the Cavaillé-Coll instrument as the logical development of the North German organ via Silbermann. The other path took the North German organ as developed by Schnitger.

The reader can see that from the time the reform movement started, nearly thirty years have elapsed, during which time many lessons have been learned, many errors corrected, and much knowledge gained.

What was said by opponents of the reform in Denmark from 1926 until 1943 is now being said in other countries. Generally, the older generations have striven to retain the romantic and orchestral type organ, while the younger generations have quickly appreciated the possibilities of the newer organs and their superiority as instruments for the performance of contrapuntal music.

There seems to be an answer for those who decline to study the subject and learn the many truisms which the modern Danish organs seek to demonstrate, if they can be persuaded to listen to the recordings of some of the Marcussen or Frobenius organs and to compare them with recordings of old German organs, especially the Kleine Orgel in St. Jokabi Church, Lübeck, and the Schnitger organ in Cappell, made by Deutschen Grammophon Gesellschaft ("Archiv Produktion").

What are the basic principles governing these modern Danish organs?

(1) Complete independence of manual and pedal divisions

(2) Power ratio between manual divisions, fundamentally related and not dependent upon enclosure

(3) True intonation, only possible with pipework speaking on low wind pressure and over slider soundboards

(4) Simplicity of action and console

(5) Most careful assessment of the acoustic conditions of the building in which the organ is to be placed and heard

We will proceed to observe how these principles have been translated into organs.

First of all, considerable research and experiment were carried out in improving the design and construction of soundboards. Working quite independently, the two firms mentioned have developed new and improved soundboards which they claim give consistent wind pressure at the pipe foot in all circumstances.

The new soundboards are constructed to very precise dimensions for a predetermined number of stops, and it is agreed that not more than 10 or 12 stops should be placed upon one soundboard.

Wind pressures employed vary from 50 to 100 millimeters (about 2″ to 4″) but generally pressures do not exceed 2½″ for manual stops.

The "Brusts" invariably are placed on a lower wind than the rest of the organ.

Reed stops take the pressure common to the soundboard on which they stand, and the low wind requires thin tongues and open shallots. The Krumhorn register is usually constructed with wooden boots and fitted with eighth-length resonators.

The Great reed is often placed *en chamade*.

The fluework is principally constructed in metal pipes, both cylindrical and conical, and tin is widely used.

Tonal finishing is carried out to ensure that the ensemble is always maintained and that no single voice predominates. All stops must coalesce, and the power is added to the ensemble through the mixtures.

The console is usually "built-in," with the "Rygpositiv" a real "Back-positiv," whilst the "Brustwerk" is a real "Breast-work" situated above the console. The Brusts are provided with doors which can be left closed or open according to the wish of the organist.

Registrational aids are at a minimum and generally consist of pedal movements to control manual-to-manual and manual-to-pedal couplers. As the organs have tonal completeness on each manual and in the pedal, the Danes are logical in not attaching importance to the provision of couplers or stop-changing facilities.

Provided that the scales and the placement of the pipes are acoustically correct, an organ need contain no more than 50 or 60 speaking stops, even in the largest building.

The science of room acoustics is not to be confused with reverberation, *per se*. There are acoustical conditions both favorable and unfavorable to organ tone. The organ builder must study all the conditions and KNOW what to do, even before the organ takes embryo form on the drawing board. (Mr. Poul Gerh-Andersen has written a most interesting article on "Danish Organ Architecture" in the Organ Club Handbook No. 5 (1951). I believe that copies are still obtainable from the Hon. Secretary, 8 Wrottesley Road, London, S. E. 18, price $1.50).

Danish organ builders are generally unhampered by one of the chief obstacles to a successful and artistic instrument. I refer to the almost complete absence of "chambers" in which organs are buried. I have seen and heard a few organs in other than a gallery position, but never any in those appalling organ chambers familiar to us on both sides of the Atlantic.

Any organ enthusiast regrets that so much beautiful craftmanship making up the interior construction, mechanism, and pipework is never seen by the public. In Denmark, it is considered that an organ is not an artistic success unless it (a) is a musical instrument (b) is acoustically correct for the room space, and (c) is architecturally correct.

The last qualification may be expressed by means of an organ case or cases, or by a functional display of pipework and construction. Qualifications (b) and (c) together play an important part in the modern Danish organ, because the design, dimensions, and other details vitally affect the tone.

Here then, we come to realize the ideals of the Danish organ builders. They regard it as their job to design the organ to meet all the specialized requirements; and unless the organ builder is allowed to and is qualified to do so, the type of organ under discussion will not result.

Naturally, there is danger of rigid form being adopted, but in practice (as a study of the stoplists at the end of this article will show) this has not been the case.

In the last twenty years, Marcussen, on the one hand, and Frobenius, on the other, have reconstructed many organs within fine old organ casings, and have often designed and built "matching" cases to house an entirely new "Rygpositiv." It will not be a point of serious controversy to state that a Tuba stop, irrespective of wind pressure, could be more or less effective according to its position in the organ. Again, instances are frequently encountered when sounding pipes cannot be heard in certain parts of the church. In the modern Danish organ, extreme care is taken to eliminate such contingencies and to ensure that every voice is given the most favorable conditions. The organ mass is concentrated, and the resonance of all parts of the organ construction contributes to the tonal output as certainly as does the violin, if the latter is looked upon as an assembly of components.

The intent of the foregoing has been to convey to the reader what are the fundamentals of the modern Danish organ and its *raison d'être*. As to tone, a detailed description is rather out of the question. In general, however, the tonal characteristics are based upon Schnitger and Silbermann, with perhaps the greater emphasis upon Schnitger.

The Danes do not attempt to reproduce, but have looked to the old builders for their inspiration. The picture is not one of efforts to build a Schnitger or other old-type organ. Nowhere have the Danes made an exact replica; they have, instead, striven towards tonal development. Schnitger's organs show the value and importance of harmonic structure. It is in this respect, also, and in their use of mixtures particularly, that the new organs demonstrate great scientific and artistic advance.

An organ pipe must possesss a clean and pervasive tone. All power development in the Danish organs is achieved by enhancing the unison register and not by doubling or trebling the unison, be the unison of 16′, 8′, 4′ or 2′ pitch. "Organa Pleno" on such organs means a very different thing from "Great, Full to Mixtures" on the average organ in our country.

"Organo Pleno" is available on any manual division with suitable tone on the pedal. Herein, possibly, lies the great difference between the modern Danish organ and, until the work of Mr. G. Donald Harrison came along, the contemporary organs of the United States of America.

There is a very wide gulf separating the normal British view on organ tone from that prevailing in Denmark. I do not suggest that the adoption of the Danish "ideals" is either acceptable or desirable to British or American churches, but there needs to be a break-away from "provincialism" in organ building and organ playing.

To return to our theme: What are the timbres and tonal characteristics of the organs we are discussing?

No one can satisfactorily describe in print the subtleties of organ tone; and the writer, never having heard first-hand the organs of your country, is in no position to draw comparisons. Happily, there are many quite good recordings of the new organs (and also some of the old Compenius organ) available in the United States. Within the limits of good reproduction, these recordings have captured the tone sufficiently to give the listener a fair impression of what these organs sound like. The ensembles and tutti are vigorous and far from squeamish. The reeds do not blot out the flues. The mixtures are really cohesive. The Quintadenas have a singing and sprightly character, enhanced considerably when mutations are introduced. Starting formants are not disguised, and there is a retention of the "Spitz" quality present in the organs of Schnitger, and so forth. Similarly, that characteristic of old German organs, called "Schnarrwerk," is present in a controlled form in such stops as Krummhorn and Dulcian.

Great Organs (Hovedwerk) are founded on a Principal 8′, and Choir (Rygpositiv) on a Principal 4′. Quite a variety of pipe shapes are employed, and such things as zinc bases are unknown. Displayed pipes are usually true length. The tracker actions are amazingly light and crisp, and throughout highest-grade materials are worked on with magnificent craftsmanship.

I conclude with stoplists which, if studied, will indicate that the new organs are adopted to a variety of conditions.

I regret that I am unable to provide illustrations of the modern casework.

SKENNINGE — Denmark

MARCUSSEN 1939

Hovedvaerk
16′ Gedaktpommer
8′ Principal
8′ Spitsflöte
4′ Oktav
4′ Rörflöte
2 2/3′ Quint
2′ Oktava
V-VII Mixtur
8′ Trumpet

Svellevaerk
8′ Gedakt
8′ Spitsgamba
4′ Principal
4′ Quintaton
2′ Hohlflöte
1 1/3′ Nasat
II Cymbel
8′ Regal

Ruckpositiv
8′ Principal
8′ Rörflöte
4′ Oktav
4′ Gedaktflöte
2′ Gemshorn
II Sesquialtera
IV Scharf
16′ Dulcian
8′ Cromorne

Pedal:
16′ Subbass
8′ Principal
8′ Gedakt
4′ Oktav
2′ Oktava
VI Mixtur
16′ Trombone
8′ Trumpet

JÄGERSBORG — Copenhagen - Denmark

MARCUSSEN 1944 [built during the occupation]

Hovedvaerk
8′ Principal
8′ Rörflöjte
4′ Oktav
4′ Gedakt
2 2/3′ Quint
2′ Oktava
IV Mixtur
8′ Trumpet (mounted *en chamade*)

Rygpositiv
8′ Gedakt
4′ Principal
4′ Rörflöjte
2′ Quintaton
II Scharf
8′ Krumhorn

Brustpositiv
8′ Bordun
4′ Spidsgedakt
2′ Principal
1 1/3′ Nasat
I Cymbel
16′ Ranket

Pedal:
16′ Subbass
8′ Oktav
8′ Gedakt
16′ Fagot
4′ Regal

The casework is in oak and the pipes in the case are in copper.

FREDERIKSBERG CHURCH — Copenhagen - Denmark

MARCUSSEN 1947

Hovedvaerk
16′ Gedakt
8′ Principal
8′ Rörflöjte
4′ Oktav
4′ Gedakt
2 2/3′ Quint
2′ Oktava
V Mixtur
8′ Trompet

Overvaerk (enclosed)
8′ Gambe
8′ Gedakt
4′ Oktav
4′ Flöjte
2′ Gemshorn
1 1/3′ Quint
1′ Sivflöjte
IV Mixtur
16′ Dulcian
8′ Skalmeje

Rygpositiv
8′ Gedakt
4′ Principal
4′ Rörflöjte
2′ Quintaton
II Scharf
8′ Krummhorn

Pedal:
16′ Subbass
8′ Oktav
8′ Gedakt
2′ Blockflöjte
16′ Fagot
4′ Regal

In this organ, a matching case was provided for the Rygpositiv. The church is octagonal in shape and, although not large, seats about twelve hundred. There are galleries.

VANLØSE CHURCH — Copenhagen - Denmark

FROBENIUS 1948

Hauptwerk
8′ Principal
8′ Gedakt
8′ Spidsgedakt
4′ Oktav
4′ Rörflöjte
2 2/3′ Quint
2′ Oktava
IV-VI Mixtur
16′ Dulcian
8′ Trompet

Ruckpositiv
8′ Rörflöjte
4′ Gedakt
4′ Principal
2′ Spidsflöjte
1 1/3′ Quint
II Scharf
8′ Krumhorn

Pedal
16′ Subbass
8′ Principal
8′ Gedakt
4′ Nathorn
16′ Fagot

This organ has special features to accommodate the blind organist of the church. There are six general pistons, acting blind. There are two drawknobs for "free combination." Drawstop knobs are made of wood and have different shapes for each class of tone. Tracker action to manuals and pedal. Electric action to drawstops.

OSKARSKYRKAN — Stockholm - Sweden

MARCUSSEN 1949

Manual I (Ruckpositiv)
8′ Principal
8′ Gedakt
8′ Quintadena
4′ Oktav
4′ Gedaktflöte
2′ Gemshorn
1 1/3′ Sivflöte
II Rauschquint
IV-V Scharf
16′ Dulcian
8′ Krumhorn

Manual II (Hauptwerk)
16′ Principal
16′ Quintadena
8′ Principal
8′ Spitsflöte
4′ Oktav
4′ Rörflöte
2 2/3′ Spitsquint
2′ Oktava
2′ Flachflöte
III Rauschquint
VI-VIII Mixtur
III Cymbel
8′ Trumpet
16′ Trumpet

Manual III (Brustwerk)
8′ Gedakt
4′ Principal (wood)
4′ Rorgedakt
2′ Oktava
2′ Blockflöte
1 1/3′ Quinta
1′ Oktava
II Sesquiltera
II Cymbel
8′ Vox Humana
4′ Regal

Manual IV (Crescendowerk)
16′ Spitsgedakt
8′ Principal
8′ Rörflöte
8′ Spitsgamba
4′ Oktav
4′ Traversflöte
4′ Koppelflöte
2 2/3′ Quinta
2′ Oktava
1 3/5′ Ters
1′ Waldflöte
IV-VI Mixtur
III Cymbel
8′ Trumpet
8′ Oboe
4′ Clairon

Pedal
16′ Principal
16′ Subbass
16′ Gedakt
10 2/3′ Quinta
8′ Oktav
8′ Gedakt
4′ Oktava
4′ Quintadena
2′ Nachthorn
1 1/2′ Rörflöte
IV Rauschquint
VI Mixtur
32′ Basun
16′ Sordun
16′ Basun
8′ Trumpet
4′ Trumpet
2′ Cornet

Echowerk (Manual IV)
8′ Dubbelflöte
4′ Principal
4′ Flöjt
2 2/3′ Quinta
2′ Waldflöte
1′ Flageolet
III Mixtur

This organ incorporates the Echowerk from the old organ. Tracker action to Manuals I, II, III and the Pedal. Electric action to Manual IV and the drawstops. Casework contains all speaking pipes of true length and some pipes are placed in the inverted position.

KROPP CHURCH — Hälsingborg - Sweden

FROBENIUS 1950

Hovedvaerk
8′ Principal
8′ Gedakt
4′ Oktav
4′ Rörflöjte
2 2/3′ Quint
2′ Oktav
IV Mixtur
8′ Dulcian

Rygpositiv
8′ Rörflöjte
8′ Quintaton
4′ Principal
4′ Gedaktflöjte
2′ Gemshorn
1 1/3′ Nasat
II Scharf
8′ Krumhorn

Pedal
16′ Subbass
8′ Oktav
8′ Gedakt
4′ Oktav
2′ Rörflöjte
16′ Fagot

UPPSALA CATHEDRAL (in the Choir) — Sweden

MARCUSSEN 1950

Manual I (Positiv)	*Manual* II (Hauptwerk)	*Pedal*
8′ Gedakt	8′ Röhrflöte	16′ Sordun
4′ Röhrflöte	4′ Principal	8′ Gedakt
2′ Principal	2′ Waldflöte	4′ Regal
II Sesquialtera	IV Mixtur	
1 1/3′ Nasat	8′ Dulcian	
1′ Cymbel		

REYKJAVIK ROMAN CATHOLIC CATHEDRAL — Iceland

FROBENIUS 1950

Hovedvaerk	*Svellevaerk*	*Rygpositiv*	*Pedal*
8′ Principal	16′ Gedakt	8′ Gedakt	16′ Subbass
8′ Rörflöjte	8′ Flöjte	8′ Quintaton	* 16′ Gedaktbass
4′ Oktav	8′ Spidsgamba	4′ Principal	8′ Principal
4′ Gedaktflöjte	4′ Kobbelflöjte	4′ Rörflöjte	* 8′ Flöjte
2 2/3′ Quint	2′ Waldflöjte	2′ Gemshorn	5 1/3′ Quint
2′ Oktav	II Sesquialtera	1 1/3′ Quint	4′ Oktav
VI Mixtur	III Mixtur	II Scharf	2′ Röhrflöjte
16′ Dulcian	8′ Oboe	8′ Krumhorn	16′ Fagot
8′ Trompet	4′ Regal		* 8′ Fagot
			* 4′ Regal

NOTE: Tracker action throughout. Stops marked (*) are borrows from Svellevaerk. Electric action to drawstops. Two "free" combination stops provided.

KJOLLEFJORD CHURCH — Norway

FROBENIUS 1951

Manual only

8′ Gedakt
8′ Quintaton
4′ Principal
4′ Rörflöjte
2′ Oktav
1 1/3′ Quint

N.B. This organ is situated in the most northerly part of Europe, near North Cape, latitude 71° 10′N.

SKOVDE CHURCH — Sweden

FROBENIUS 1951

Hovedvaerk	*Svellevaerk*	*Rygpositiv*	
16′ Gedaktpommer	8′ Nathorn	8′ Traegedakt	II Cymbel
8′ Principal	8′ Salicional	8′ Kvintadena	8′ Krumhornregal
8′ Rörflöjte	4′ Oktav	4′ Principal	*Pedal*
4′ Oktav	4′ Flute oktav	4′ Rörflöjte	16′ Principal
4′ Spidsflöjte	2 2/3′ Nasat	2′ Gemshorn	16′ Subbass
2 2/3′ Quint	2′ Gedakt	1 1/3′ Quint	8′ Oktav
2′ Oktav	VI Mixtur	III Scharf	8′ Gedakt
1 3/5′ Terts	16′ Trompet	8′ Dulcian	4′ Oktav
V Mixtur	8′ Trompet	*Overvaerk*	2′ Quintadena
8′ Trompet	4′ Trompet	8′ Gedakt	IV Mixtur
		4′ Kvintadena	16′ Basun
		2′ Principal	8′ Trompet
		1′ Blokflöte	4′ Regal

This is the first all-tracker, four-manual organ built on the new principles. Note that the Hovedvaerk, Svellevaerk and Pedal are built in the old case, whilst a new case was built to house the Rygpositiv.

RUSSELL HANCOCK MILES

RANDOM NOTES ON BACH

THE recognition of Bach's genius and dissemination of his works was the greatest single achievement of the romantic period. In those exciting days of personal expression it was providential that baroque tradition was not widely known, for an attempted revival of Bach in that idiom would have died a-borning. The false tradition inagurated by the romanticists, therefore, was as desirable as it was inevitable. What is to be lamented is the fact that the time lag between the establishment of the false tradition and the renewal of interest in the true one was so great as to have permitted the former to become firmly entrenched in musical thought and practice.

Pioneers in the baroque revival that is flourishing in many parts of the world today faced a task that must be described as horrendous. Such towering figures as Stokowski, Busoni, von Bülow, Liszt, Schumann and Mendelssohn cast a romantic shadow that stretches unbroken right back to the revival of the Passion according to St. Matthew in 1829 under Mendelssohn's direction. The first attempts to dissipate that shadow must have seemed quixotic.

A second great obstacle in the path of the revival was the period of oblivion that extended from Bach's death in 1750 to the above-mentioned performance in 1829. This period of insulation almost obliterated the research trail at a very critical point.

A natural barrier against a complete realization of baroque tradition is the strutting instinct that drives many exhibitionists to the stage, pulpit, concert platform and organ bench, to enumerate a few outlets. Strutters on the organ bench rely upon pyrotechnics and emotionalism to attract attention to themselves. When they use Bach as their vehicle they perform the difficult works as fast as possible and the easy ones as sentimentally as possible.

Further, there are the laymen who comprise the majority of most audiences and for whom, therefore, music is actually composed. For the most part, they are either ignorant of or oblivious to the fact that the appreciation of contrapuntal forms demands informed and attentive ears. They merely know what they like and dislike. The strutting opportunists, recognizing this quantitatively rich field, add greater surface appeal to Bach by underlining fugal subjects on a louder manual, changing registration at frequent intervals and pumping the swell pedals. This, in addition to playing the difficult works as fast as possible and the easy ones as sentimentally as possible!

Lastly, there are those who feel sincerely that Bach should be performed in free, romantic style. All such are rationalizing a desire. One cannot *feel* music history and tradition. One must *know* them. If it be argued that history and tradition should be ignored in the performance of baroque music, the question then naturally arises, "Why do they figure so importantly in the interpretation of plainsong, renaissance and classic music?" What priest would take it upon himself to offer a personal, dramatic intonation of the music of the mass? What would metropolitan critics have to say about a pianist who ignored classic tradition completely in the performance of a Mozart sonata? By the same token, why do so many organists *feel* that Bach should be interpreted in free, romantic style? Is it not their duty to *know* history and tradition and to re-create his music in accordance with that knowledge?

Romanticists who must inject personal emotion into every kind of music allege that Bach is expressionless, colorless, cold and without meaning when performed in baroque tradition. Books have been written to refute that allegation, of course, but romanticists as a class do not usually read books on music. They believe that knowledge destroys intuitive interpretive gifts. The function of music, according to them, is to move people, and the key to that power cannot be found in a book. Books on music cannot stir the imagination and supply inspiration for deeply moving, up-to-the-minute twentieth-century personal interpretations of music from any time or clime!

There are also those who *feel* that, since so many of the instruments of Bach's day are obsolete, it is impossible to perform his music today as he heard it and intended it to sound. All such should read more about Bach and come to *know* that the medium of performance and therefore the color given his music were not of paramount importance. The Schübler chorales were transcriptions by Bach himself from certain of his church cantatas. All of the great Weimar organ works had been composed when Schübler asked Bach to submit a few organ compositions for publication. Most of the clavier concertos were transcribed by Bach from his violin works. The Prelude and Fugue in D minor for organ each came from a different source. The Prelude was written originally for clavier, and the Fugue for unaccompanied violin. An organ fugue in G major is a transcription of a chorus in a church cantata. The Passacaglia, which undergoes greater variety in tone color and intensity than any other work played by organists, was composed originally for clavicembalo with pedals. An unbelievably long list of transcriptions made by Bach himself from his own compositions could be compiled. Granted that circumstances compelled him to take this easier road for the preparation of material needed for a constant stream of musical events, it is known for a certainty that Bach would not have considered making such transcriptions had he felt that they would have violated his ideas or ideals.

Bach learned early in his career that tuneful fugal subjects were unsatisfactory in that they distracted attention from the countersubject and other supporting contrapuntal lines. Likewise, he shunned highly individualistic colors as usurpers of the attention. About the only places in ensemble music where he depended upon color for its own sake were in vocal arias where he employed a specific instrumental color for programmatic support. In no instance did he change the color during the course of an aria. The chorale preludes similarly give expression to a single emotional value throughout, and any change in color violates both the letter and the spirit of those great works. The Art of Fugue was a veritable black and white pen drawing. It was written in open score, with no instrument, instruments or colors specified. It was this fact that led authorities to believe for many years that the work was a theoretical treatise on fugue and canon. Only in comparatively recent years has the realization come that it is a monumental work of art developed in linear patterns that require none of the trappings of color or other sensuous appurtenances for their complete and satisfying realization.

It is in the area of tempo and rhythm that the most serious errors are committed by the romanticists and, unfortunately, it is here that the spirit of baroque music can be most easily destroyed. As the tempo of romantic music must be individualized, so must the tempo of baroque music be stabilized. It is a strange fact that romantic music cannot be elevated above the plane of personal passion, but baroque music, lowered to the personal plane, is rendered enjoyable even to those who do not understand it. Chopin, for example, played in baroque style falls to earth a dead weight. On the other hand, Bach performed in romantic style is always interesting, often intriguing.

In spite of great divergence of opinions, extending all the way from Thomas Mace to Gilman Chase, there is rather general agreement regarding the fundamental principle of the baroque *Affekt*. Highly individual emotional interpretations, such as Mr. Chase authorized in an article in the Winter, 1954 issue of this magazine, would do violence to the underlying "affection" of Bach's music and destroy, therefore, a basic and traditional attribute. In that they would incorporate some effects neither consonant with eighteenth-century practice nor possible of execution on eighteenth-century instruments, they would also be anachronistic.

A careful study of Bach's scores will uncover an amazing system of "built in" agogic accents. Syncopation, suspensions, increase and decrease in the number of voices, gradual lengthening of note values approaching important cadences, lunging ahead suddenly in notes of shorter value are all a part of that system. When "re-created" over a steady, constant pulsation, they provide ample variety without disturbing the *Affekt*. When "interpreted" with rhythmic freedom, the carefully planned effects become distorted.

It is almost incredible how Bach compels artistic phrasing by the use of rests and the frequent separation of a single note from a group of notes of the same value. Traditional alterations of note values within beats and the execution of ornaments can be effected without disturbing the even pulse of the music.

A steady beat is not inherently monotonous, mechanical, unmusical. One must not fail to distinguish between counting beats and feeling pulsation. The emotional depth of a performer determines whether the music he produces will sound metronomic or pulsative. Steady pulsation and expressive music are not incompatible. As the military march, the ballroom dance and the church hymn demand uniform pulsation, so does baroque music, and for essentially the same reason. It gives stable expression to the emotions of mankind, not variable expression to fleeting individual moods. With a few notable exceptions, a movement of baroque music expresses but one emotional value from beginning to end. Variations in tempo disturb the established feeling and reduce the music from the universal to the particular. *Performers who insist upon individualistic interpretation work for the destruction of the very characteristic that differentiates baroque from romantic music.*

Between the extremes of metronomic slavery and individual freedom lies constant but *deeply felt* pulsation, within which phrases can be turned neatly, cadences rounded out and embellishments executed with clarity and poise. When traditional conditions are met by a capable and self-effacing performer, the master planning, the emotional value and the ageless beauty of Bach are re-created as a matter of course. No greater achievement is possible for a performing artist.

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Vol. I

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ISA McILWRAITH

ORGANS SEEN ON A SUMMER'S TRIP IN WEST GERMANY

First of Two Parts

A LONG-standing desire to see Germany is a feeling that is easily understood by any organist. Who would not wish to know at first hand the land that has produced such a myriad of organ composers, as well as the one composer who is any musician's chief reason for being an organist? Add to this the compulsion of what seems like half a lifetime of listening to talk about the beauties of old German instruments. Then there is the fact that modern European and American interest in seventeenth- and eighteenth-century tonal principles was stimulated by the Praetorius organ, reconstructed by Oskar Walcker for Willibald Gurlitt at the University of Freiburg in Breisgau, and by Albert Schweitzer's championing of Silbermann instruments.

In Germany so much came to our attention that is worth telling, that it will be hard to confine myself to organs and the churches in which they stand. Even within these limits some difficult choices will be necessary.

Since we had made arrangements with friends in Munich for the use of a car during our visit in the country, our first stop was in that city. There, during our first day, we had the bitter experience that was to be repeated so often during the summer — that of finding many churches heavily damaged. Had they not been originally built to endure for centuries, with construction that was a marvel of massiveness and solidity, they would have been blown to bits. As it was, church after church had been burned out. Roofs had collapsed. Window glass had been broken or melted. Gaps had been blasted in walls, and organs had gone down in ruin.

In the face of all the devastation of every description, it was a tribute to the spirit of the people that they were rebuilding with a will, doing it earnestly and well. Our first service was a High Mass at the Cathedral, the Frauenkirche, which had been badly damaged. At present much destruction is still in evidence, although it is being repaired. The floor is still of earth, and because there are now no chairs or pews, the congregation was obliged to stand throughout a long service. The reverence and devotion of the people there — all of them plain people dressed in simple clothing — brought tears to our eyes.

The organ was destroyed, and now a small ersatz organ is in temporary use, up in the rear gallery where the choir stands. That morning we heard the Bruckner *Mass in E minor*, done with orchestral instruments. Much of the music was beautiful, and the trumpeters were excellent.

One of the places in Munich that tempts the visitor to stay for days on end, or even weeks, is the Deutsches Museum. Only two-fifths of it is again functioning, including much that has been rebuilt. Here we spent two days in just a part of the institution, a large portion of that time in the beautifully rebuilt music room for keyboard instruments. In the collection are a number of organs.

First of all, a playable reconstruction, with eight pipes, of Ctesibius's water organ, hydraulus, or hydraulis, after Heron's description (100 A. D.), stands against a side wall.

In the gallery is a processional organ of three stops: Coppel 8′, Flöte 4′, and Prinzipal 2′ with tiny wooden stop-knobs to the right of the keyboard. The manual has a four-octave compass with a short octave in the bass. The feeder bellows are on the right side,

and the reservoir on top. Wind pressure is 47mm. (slightly less than 1 7/8"). The instrument has wrought iron handles, front and back, through which long poles can be slipped for carrying it.

A Positiv in the same gallery has four registers: Oktave 2′, Oktave 1′, Flöte 4′, Gedeckt 8′. The bellows are pumped by pulling leather straps on the side of the organ.

Another Positiv has only two ranks, one 4′, the other 2′. These last three instruments all date from before 1750. Several other Positivs from this period, each with its individual characteristics, are awaiting repair.

Though there is not space to mention all of the organs here, one curiosity calls for at least a few words. It is an Orgelklavier (organ-piano) of two manuals and a pedal board, built in the early nineteenth century. The upper manual is a piano, the lower an organ with four registers, five octaves. Stop knobs are on the lower left part of the front. The pedal board, placed left of center, is chromatic with twelve notes from C-B. (Prototype of a modern atrocity inflicted upon the organ world?) There is a pump pedal for the right foot.

At opposite ends of the large room stand two larger organs. One of these calls for no special comment here. It is a Steinmeyer, typical of examples built around the turn of the century and for quite some years after that.

The other was difficult to leave, after discovering it. Situated in the center of the gallery, opposite the entrance door, it commands the finest location in the collection. An inscription painted in red and black lettering across the front of the case states that it was originally built in 1630, destroyed by the Swedes in 1632, then rebuilt in 1636. The organ has the short octave at the bottom of the single manual, and on the pedal the lowest five notes look like E, F, F♯, G, G♯, but sound C, F, D, G, E. Also the top pedal note looks like B, but plays B♭.

The disposition of the stops is as follows:

Left	Right
5 1/3′ Quint Bass	4′ Coppel
8′ Octave Bass	2′ Octav
16′ Sub Bass	1 1/3′ Quint
8′ Flauten	1′ Mixtur
4′ Principal	1/2′ Cimbel

The manual compass is four octaves: C - c^3. Wind pressure is 56 mm. (2 3/16"). The stop knobs are of wrought iron attached to wrought iron rods. To draw these, they are pushed downward and outward into notches, an operation requiring great strength. The three large bellows behind the instrument were originally pumped alternately by one man. Now one of them is operated electrically.

Having received permission to play the instrument, I spent a wonderful hour at it. The voices are exhilarating in their lightness and ring. The experience of playing on keyboards tuned in mean-tone temperament was that the key of C major is magnificent, far excelling in beauty what we are accustomed to in our equal temperament. The keys F major and G major are good. The fifth B - F♯, on the other hand, is very bad, and keys above A major are not pleasant. Even some chords in A are not good. However, with compositions written to take advantage of the good points in this tuning, what delight for the ears!

Where was this organ originally housed? Until 1907 it was the instrument used in the Wallfahrtskirche (Pilgrimage Church) of St. Maria, in Thalkirchen, now a suburb

of Munich. The latest chapter in its history is that it was again destroyed, this time by bombing in 1944. Just a few pipes from each register were left, and these were used as models for the restoration in 1952 by the present curator of keyboard instruments, Mr. Fritz Thomas, who showed us many kindnesses and made our visits to the museum occasions long to be happily remembered.

On the evening following the first visit to the Deutsches Museum, we heard an organ recital at the Erlöserkirche (Church of the Redeemer), Schwabing, another suburb of Munich. The organ there is a modern instrument by the firm of Moser in Munich. The ninety stops include, among the mixtures, one of nine ranks. Although the organ has much brightness, that evening I felt that the low register and the high did not blend together very well. Also, in spite of the brightness just mentioned, there was a certain muddiness in the lower portion of the compass. This might well be considered finicky on my part, for the instrument has many more musical possibilities than the majority of instruments in churches of similar size on either side of the Atlantic. The sight of a good sized church comfortably filled with people for a program by a rather young performer was most welcome.

This organ and the one at the Lukaskirche on Mariannenplatz are the two most used for organ recitals in Munich. The Lukas organ is a four manual, seventy-seven stop G. F. Steinmeyer of 1932. It was damaged in the war, but has been repaired. Situated in a large, reverberant church that is acoustically good when filled, the organ is fine. Though it is somewhat smaller than that at the Erlöserkirche, we much preferred it. A trip up to the organ loft involved mounting a long staircase of heavy stones that spiralled around a massive stone column. Arriving in the gallery, we were surprised at the unusually large space in the loft for choristers, instrumentalists and organist. The pipes of the organ stand free and speak directly into the church proper, as they should—a fact that was impressed upon us throughout our trip in Germany. German architects and organ builders are to be praised for this display of wisdom, that contrasts so markedly with the unfortunate placements of instruments in our part of the world! Although I shall not give the stop list here, it was gratifying to see a pedal division equipped with seven reeds, including 32′ and 16′, as well as flue stops; also to see a Rückpositiv on the gallery railing in a modern organ.

The organ in the Regensburg Roman Catholic Cathedral was a great disappointment. In a church whose boy's choir enjoyed some reputation, I had expected a good instrument. At first we could find no signs of any any organ at all, and we were not the only seekers in the same dilemma. Several men we happened upon had been wandering around in the building longer than we had, and still had located no pipes and no console. Had a verger not appeared on the scene, we undoubtedly would have left, firmly convinced that the churchmen of the Regensburger Dom felt no need of anything other than human throats for music-making. And, as we discovered, we would not have been very far from the truth! None of us could believe our eyes when the attendant conducted us into a subterranean passage behind the altar. There, squeezing our way along, all hunched over, we passed some poor, bottled-up organ pipes that spoke from this Hades-like lower level. We wormed our way to a small opening behind and to the right of the altar, cut off from the rest of the church by a high curtain. At services all the musicians are packed in this cubbyhole, completely out of sight. Some of the organ pipes are not completely buried but speak into the free space immediately behind the altar. Without hesitation I can say that they would be better down with their fellows below, forty-two raucous ranks in all!

The situation in Nördlingen is far different. Here in this walled, medieval town, the stately Lutheran Church of St. George dominates the landscape. The entire back of the building and most of the glass were destroyed in the war. Since the large Steinmeyer organ was in the rear gallery, it was annihilated, too. The building is now repaired, but there is no money to replace the big organ. How to solve the problem of providing the much needed pipes was the question. High on the south wall was an old organ dating from the year 1610. This instrument had long been silent but had been kept for the beauty of its case. A Swiss patron came forward with a donation large enough to provide new works for this case. Steinmeyer was chosen to do the work, building a small two manual with pedal. The registers are:

Manual I	*Manual* II	*Pedal*
8′ Prinzipal	8′ Holzgedeckt	16′ Subbass
8′ Rohrflöte	8′ Violflöte	8′ Oktavbass
4′ Oktav	4′ Nachthorn	4′ Pommer
8′ Trompete	2′ Oktav	
2′ Mixtur	1/2′ Cimbel	

Couplers are: one for the two manuals, and one for each of the manuals to the pedal. There are no swell boxes and no crescendo pedal. The straight pedalboard goes only to F. Straight though it is, the feel of it is remarkably good. Manuals have a four and a half octave compass to g^3, with the color of the keys reversed — black naturals and white-topped sharps and flats. The little organ sounds amazingly big and bright in the church, adequate, even, to support the sturdy congregational singing. The acoustics in the stone interior are favorable, with some glow, but not too much.

A peculiar thrill was provided by the climb to the swallow's nest to play this organ. The way was up one branch of an odd construction, an ancient double spiral staircase. It was breath-takingly steep, with a big chunk chewed out of the middle of one of the lower stone treads, a dangerous stairway, and dark. Once up, the narrowness of the quarters demanded squeezing sidewise through a tiny passageway behind the organ in order to reach the console around at the front. One requirement for the organist's position here is slenderness!

At Würzburg am Main, the ancient Romanesque cathedral, from the eleventh century, was just a charred shell of walls when the fires died out, as was everything else that stood at all. This church is now being rebuilt, but the work will continue a long time before it is restored. In the meanwhile, the much smaller Neumünster, standing next to it, has been rebuilt, and is being used as the present cathedral. It is behind this Neumünster that Walther von der Vogelweide is buried in the monastary yard, although no marker now remains to inform the visitor of this fact, the once beautiful cloister and garden that surrounded the grave having been obliterated in the general tragedy.

The Neumünster, a large church according to our American ideas, is an excellent example of Baroque architecture. The new organ in the rear gallery, for which there was time for only a brief visit, is a fifty-three stop Johannes Klais instrument that sounds splendid. Tonally it compares favorably with the finest organs built here. Acoustics in the building are also alive and promote good musical results.

During the days that we spent in this neighborhood, we put up at a small hotel in the town of Kitzingen am Main. Only a few minutes' walk from this hotel, the Bayrischer Hof, is the Protestant Church, also damaged in the war, and now being repaired. Here we found two rear galleries, one above the other, with the organ installed in the

upper one. Though only partly built now, the instrument is to be one of sixty stops. Steinmeyer has saved as many of the old pipes as possible and has re-made them. The organ includes a Rückpositiv. Even the far from finished instrument sounds excellent. Acoustics here are splendid, too.

Several days later and many kilometers further found us in Celle, with its castle that had held such an attraction for J. S. Bach because of the French music performed there. His desire to hear it had urged him forward more than once, to travel the long, hard sixty miles between Lüneburg and Celle on foot. Today the exterior of the castle looks much as it did in Bach's time. Early Renaissance in style, its plan is a quadrangle of buildings around a central open court. It is built of brick covered with yellow stucco. The highest knoll in the region was chosen for its site, and a defense wall originally girdled the structure for further protection. This wall has been removed so that since the beginning of the nineteenth century the castle has given an air of graciousness to all its surroundings with its park, lake, and river. The façade is flanked by two low, massive towers, the one on the left with its green copper roof being of special interest, for it is here that the chapel is located. Although the castle interior has lost most of its handsome original furnishings, others were brought, from various places, in 1938. The theater where Bach heard the French music is again in use. Regular series of plays are produced in it. A more delightfully appointed small theater would be hard to imagine. It has three hundred and twenty white seats, pillars and balustrades, maroon upholstery, gold trim, and a crystal chandelier. Built in 1674, it is the oldest theater in Germany.

Although the organ in the chapel is inaccessible — it is under the government's monument protection and at present the tiny gallery where it is located is locked and sealed — the small chapel itself is so unique that it deserves some mention. Dating from the second half of the fifteenth century, it is the oldest part of the castle, and has remained unchanged for centuries. Work on it was probably completed in about 1576. The interior reflects the styles of several periods, Gothic in the pointed window arches and cross-shaped vaulting, Renaissance in the flatly rounded arches of the galleries. It is a northern interpretation of Renaissance, alive with paintings and figures in high relief. Christ, the Apostles, and the Prophets range along panels supporting the railings of the balconies. These figures are separated one from another by standing angels, all of them winged boys playing various musical instruments and apparently making "a joyful noise unto the Lord." Paintings decorate the triptych altar, the wings of the organ case, the pulpit, the pews. The main gallery on the left side, which is glassed in with a series of high windows containing round leaded panes, adds a decidedly novel touch for western eyes. The prevailing color scheme of the chapel is also very unusual, with its dark greens and blue, relieved by gold. To look at the enchanting organ case standing in the corner of the gallery to the left above the altar was tantalizing in the highest degree, so near and yet so far! The two winged doors that may be closed in front of the display pipes, have New Testament scenes decorating their inner surfaces. The appearance of the case, as seen from the main floor of the chapel, is like that of a number of early seventeenth-century organs I saw elsewhere. During the sixteenth century the earliest organ in the castle chapel was installed. Whether any of the present instrument goes back that far, I do not know. It has eight stops on manual and pedal. Further information was not available. The committee in charge of national historical treasures is planning to have the organ reconditioned. Let us hope they choose a builder wisely.

Only a few hours after leaving Celle, we were roaming the streets of Lüneburg and being gently called down by a policeman for jay-walking. Here in this typically northern

city with its rows of corbie-gabled house fronts, the St. Johanniskirche is a landmark. Our choice of a time to see the inside of this towering church seems to have been most unfavorable. Upon opening one of the main doors to enter, we were barred by a verger who told us emphatically that no visitors were to be admitted then. They were making preparations for a baptism. With this the door was shut in our faces. We stood in the shelter of the entrance porch watching rain inundate the pavement. They might be planning for a christening inside, but we had no enthusiasm for one outside! A noise behind us indicated a door opening. It was the verger. His conscience must have nipped him. Would we like to come in? If we would hurry, we could see the interior and be out again before the momentous happening. It was that or nothing, for we could remain in the town only a few hours. A rushed trip around in St. Johannis followed. The great bulk of the structure is impressive. It is tremendous — red brick inside as well as out, even to the aisle pillars. Many of the pre-Reformation Roman Catholic appointments have been preserved. We were to observe this sight in many more churches, a sight that pleased us for it was evidence of a people who, while strong in faith to the point of sustaining the first successful Christian reformation in history, yet were not filled with fanatical hatred for all that was associated with the old form of worship.

The large rear gallery organ in the higher of two galleries has a rich case, although the pipes displayed in it are rather dull looking. It is the same case that J. S. Bach looked upon when he was a boy going over to the Johanniskirche to hear Georg Böhm play. The organ however has undergone rebuilding, and now eight more ranks are being added. Before we dashed out, I had just time to catch a glimpse of a small front organ visible in the gallery to the right of the main altar.

Walking westward along the main thoroughfare of the town, we headed for the Michaeliskirche and a wedding, although we did not know about the latter until we set our feet inside the doorway. Once in, we sat ourselves quietly in a side aisle toward the rear, hoping to avoid a repetition of our reception at the Johanniskirche. Success! We witnessed the ceremony, and so had an opportunity of hearing the organ. Now we were in the church made famous by the presence of J. S. Bach as a choir boy there at the beginning of the eighteenth century. This structure also is of brick, the favorite building material of the north. The bricks on the interior, however, have been plastered over, and painted cream color, so that the atmosphere is bright, in contrast to the darkness that prevails inside St. Johannis, in spite of its many windows. I could not help wishing, though, that the Michaelis church fathers had done as their neighbors and left the bricks untouched. The arrangement of pews in the Michaeliskirche, as well as in the Johanniskirche, the Georgkirche in Nördlingen, and many other Evangelical churches that we saw, is curious, though logical. The determining factor is the position of the pulpit. For some reason this is often placed quite far back in the church. That in the Michaeliskirche is a good three-quarters of the way from the front and against one of the left aisle pillars. In this church the pews under the side balconies face in toward the pulpit. Those in the nave, situated in the long space between the pulpit and the main altar, have a most eccentric feature: seats that face both front and back. Both sides of the pew back-rests are equipped with seats so that the worshippers may face either the altar or the pulpit, as required. Unfortunately we were not there for a regular service so that we could not watch the right-about sit.

Happening in upon a wedding and hearing the organ at once made me aware from its sound, that it could not be the organ of the Bach period. Later on we learned more details through the friendliness of a feminine sacristan. It was not the organ Bach knew.

The organ of that era was built on the north wall of the chancel. Then several years after Bach's departure, another organ was installed by a Hamburg builder, Mathias Dropa, in 1708. Now there is no sign of an organ ever having been on this north chancel wall. The present instrument is located in the upper of the two rear galleries, and it was after mounting up there to meet the organist Jan Bender, that we were informed about this organ. It was built by P. Furtwängler & Hammer of Hannover. Not a particularly happy example of the organ building art, it suffers from the usual difficulties of pipes required to speak on high wind pressure. A three manual of fifty-five stops, its manuals are four and a half octaves, C to g^3, in compass. The pedalboard extends to f^1 and is slightly concave with the middle black notes cut back a little. Only two ranks now remain from the Bach period: an 8′ Rohrflöte and a 16′ Quintaten.

Although we were total strangers to him, Mr. Bender received us most graciously, and spent some time talking with us and showing us his domain. I must have turned a vivid emerald when he led us to a two manual Neupert harpsichord of 1935 that stands in the first rear balcony. He uses this instrument frequently for choral accompaniments. It is here in this lower gallery that the choir is stationed, so naturally, the rapport between organist-director and the singers is most satisfactory when the Kapellmeister is down here on the same level with them, leading from the cembalo. The space offers a fine area for music making.

It would hardly be right to say good-bye to this Michaeliskirche without telling about its sad fate. Its history is a long one, reaching back to the year 955, when the original structure was started as a Benedictine monastery. The present church was begun in 1362 and completed in thirty years. Spared in the past war, the life-expectancy of this venerable building is estimated as somewhere between fifty and two hundred years at the most. Why? Because it, as well as the entire old section of Lüneburg, is located on top of ancient salt beds that have been worked for centuries. Much salt has been extracted. The ground water continues the process of leaching and at the same time keeps the overlying gypsum strata in motion so that all the buildings on the surface are under constant strain. In spite of the solidity of their construction, they show serious effects and the whole territory is unsafe, although people continue to inhabit it. The church, with walls many feet thick, has been so warped and twisted that the Leaning Tower of Pisa is uninteresting by comparison. Every few months masons must go over the church, forcing fresh concrete into new cracks. At other times steel braces must be added to hold the building together. Since no remedy for the cause of the trouble is possible, it will be only a matter of a few generations before the final collapse.

Still on the trail of places associated with Bach, on this side of the Iron Curtain, we made Lübeck the next stop, and headed directly toward the Marienkirche and the majesty of brick Gothic architecture at its best. Walking up to the front of the church, we were impressed with its immense size. The relative simplicity of the façade intensifies the feeling of expansiveness created by the mass. St. Mary's was terribly damaged during the war. It was completely burned out. Everything that was not brick or stone went. The tall, twin spires were destroyed. The roof crashed down in flames. The huge bells in the belfry melted, fell when their supports burned through, and tore through the brick paving below. There they lie now, muted memorials of the holocaust. The entire structure was shaken and bent from the bombing. The gigantic main piers and the vaulting over both the nave and the side aisles of this splendid, old church were badly broken. When everything else went down in ruin, nothing could be done to save the three organs either: the famous Totentanz organ, the small organ on the stone rood

screen, and the large rear gallery organ.

The Gothic case of the Totentanz organ in the north aisle had faced the Totentanz chapel. This instrument, of three manuals and pedal, had possessed thirty-seven voices dating in part from the year 1475, according to an account circulated at St. Mary's Church after the war. Another account gives the date for the organ's origin as 1492. In 1936 the instrument had been carefully restored to its finest early condition. Now it is only a memory. What was the significance of the appellation "Totentanz," used for this organ and chapel.? The name, Dance of Death, had been derived from the mural painted around the walls of the chapel on the north side of the church in 1463 by Bernt Notke — a reminder of the terrifying plague that had swept through Germany at that period.

The mighty Gothic case of the rear gallery organ, the only case from its period which had contained 32′ pipes, had been there since the early sixteenth century.

When the flames at last ceased, the remaining walls, six and more feet thick of solid brick, threatened to collapse. In desperation the citizens tried to procure steel beams to support them. After endless delays, and barely in time to save what was left, supplies came. Work is now under way to restore the church, but what took a hundred years, 1251-1350, to build, will require weary years to repair. At present the nave and right aisle are open. The left aisle and Totentanz chapel are closed off since they are unsafe. Most of the services are being held in a small chapel on the south side of the building, although on the Sunday that we arrived, a special noonday service for hundreds of displaced persons, took place in the nave. The only musical instrument now in this, Buxtehude's old church, where Bach as a youth was fascinated by the beauties of the Abendmusiken, is a tiny Positv on loan. Judging by its appearance and disposition, the organ must date from the seventeenth or eighteenth century. For the big service in the nave, electrical amplification from the chapel was used for the organ prelude. To hear how well this little instrument met the demands made upon it was a revelation. Here are the stops on the solitary manual with its four-octave, C - c^3, range

Diskant (Stops on left)	*Bass* (Stops on right)	
4′ Prinzipal	4′ Prinzipal	Tremolant
8′ Gedackt	8′ Gedackt	Zimbelstern
4′ Flöte	4′ Flöte	
3′ Quinte	3′ Quinte	
2′ Oktave	2′ Octave	
8′ Regal	8′ Regal	
1 3/5′ Terz	1′ Octave	
III Mixtur	III Mixtur	

In the discant the Regal is not working, and the Zimbelstern is silent. The break between discant and bass comes at middle C. Now the bellows are pumped electrically. Maroon or terra cotta are the colors of the organ cabinet. The unpainted tin pipes showing at the front of the case are framed by gilded scroll work. The ivories on the keys are golden with age, and the wooden surfaces around the keyboard are decorated with designs in ivory and ebony color.

How saddening it was to read a notice in this church, the place which had drawn travellers from far to hear its music, that an organ recital was to be played at *another* church in Lübeck. How many years will it be before St. Mary's will again have a glorious organ of its own?

(To be continued)

ERNST FLADE

THE ORGAN BUILDER GOTTFRIED SILBERMANN

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Part Five

SILBERMANN'S PRACTICES AS AN ORGAN BUILDER

BEFORE the organ builder can make his plans for an organ, he must acquire a complete knowledge of the acoustical properties of the church by making a careful study of its enclosed space. The character and voicing of the registers, perhaps also the choice of site for the organ, will depend entirely upon the results of this space examination. It is told about Silbermann, that before building an organ he would stand in the middle of the church and pound on the floor with his Spanish cane. He would then determine the specification, scale, and voicing of the organ in relation to the length or shortness of the reverberation. It is for this reason that Silbermann's works are so wonderfully suited to the churches in which they stand.

This room inspection usually precipitated the first quarrel with architects or local authorities. The architect often had the idea of a medieval organ, which would be perched behind pillars like a swallow's nest. Silbermann, on the other hand, wanted his organs to form a part of the decorative scheme of the church, and he wanted them to be located near the balcony rail. Then, he claimed, they would sound quite differently.

The period in which Silbermann built his organs was favorable to the development of tone because of the general use of wood in church construction. For this reason, Silbermann's organs sound particularly well in village churches of the Erzgebirge, with their double wooden balconies and their wooden ceilings. Such rural character is also found in urban churches, for instance, in those of Reichenbach, Oederan, and the former churches of Greiz and Mylau. In the churches of Dresden, Freiberg, Zittau, and Rochlitz, which are primarily built of stone, wood still played a more important role than today, when concrete and steel have become the principal building materials in church construction. The more daring domes and pillars that have become possible through using such modern materials were then hardly thinkable. And how unfavorably they affect acoustics!

When he inspects the church, the organ builder must determine whether the organ loft is strong enough to support the weight of the organ, which in some cases is quite considerable. (At Zittau the organ weighs 300 hundredweight [15 tons].) Therefore, the very first point in Silbermann's own directions for examining a new organ is that its foundations must be examined. In the church at Greiz and at the Sophienkirche in Dresden, Silbermann had unfortunate experiences with insecure foundations. The same trouble was feared in the organ at the Frauenkirche at Dresden, however without reason. In all these cases Silbermann was not responsible for the trouble that occurred.

The frame of the organ was now placed on the organ loft. For it Silbermann used posts and pillars of strong fir trees, which were usually provided by the community. If there is adequate space for the installation, the organ builder can build a better sounding organ that is more easily accessible, and because of its simpler mechanism, more economical. With his first large organ in the Cathedral of Freiberg, Silbermann had so much

space that he was able to give prodigal width to the interior staircase. The organs at the Sophienkirche in Dresden and at Rheinhardtsgrimma also enjoyed favorable position and space. In the organs in St. John's in Zittau, St. Peter's in Rochlitz, and at the Frauenkirche at Dresden, Silbermann is said to have used a small space in an exemplary fashion.

All of Silbermann's organ cases are in a baroque style. Those of the greater Silbermann organs, as in the Cathedral at Freiberg, several in Dresden, and St. John's in Zittau, did not come from Silbermann's workshop, but were made by professional sculptors. But the cabinets of the smaller organs with their front sides decorated by leaves and sculptured angels probably always originated in Freiberg. Master Silbermann employed several carpenters who could build such cabinets easily. He, himself, showed a considerable understanding of the art of painting and decorating. He was familiar with Goldmann's *Complete Instruction in Civil Architecture* and quoted from it in order to dissuade the people of Zittau from their unfortunate idea of having their organ cabinet painted like marble. For his organ housing Silbermann used alabaster paint with golden decorations exclusively, or gray on gray with pearly color in the cornices. This was the great fashion of that time. The decorations of almost all of Silbermann's organs were done with much taste by the artist family Butzäus. Silbermann's omission of overly ornate knick-knacks was already appreciated in his own time by progressive people. The case of the Freiberg Cathedral, with its many figures in life size, is reminiscent of an earlier period. However, it was not executed by Silbermann, but by the organist, Lindner. Silbermann occasionally decorated his organs with his own insignia, as at Forchheim and Nassau. More frequently he attached the coat-of-arms of the owner, as for instance, the city coat-of-arms in the Cathedrals at Freiberg and Zittau, the clover leaf of the Carlowitz family in Grosshartmannsdorf, and the striding heron at Forchheim. Often he inscribed Bible verses. According to an old custom, Silbermann's apprentices sometimes put documents at secret places inside the organ, some of which were found recently at Mylau and Dresden.

In older German organ building, the case work used to be protected by doors which would open and close, like the wings of a triptych, or by curtains to protect the organ from dust. Casparini still recommended a curtain which could be drawn over the part of the organ where the reed pipes stood. To be sure, we find it mentioned that Christian Butzäus was supposed to paint the screen around the cabinet of Silbermann's organ at the Sophienkirche at Dresden. But, perhaps, that meant only a part of the housing. Silbermann used neither curtain nor movable wings. Similarily, Silbermann's contemporary, Dom Bédos, urgently advised against either of these practices, because curtains usually became dust catchers, and the movable wings often created unpleasant vibrations. Where the space permitted, Silbermann used to cover the organ with a wooden roof. That was less harmful and more to the purpose. Naturally, most of the dust would fall upon the organ from above. In the oldest German style of organ building thick cloths were spread over the organ, like a canopy. They were attached to the roof of the church by a cord running over rollers and could be pulled up. Adlung still recommended this cloth, or a roof of boards. Several forms of decoration shown in French organ cases are found in Silbermann's also. For instance, the musical instruments on the towers, the violins, horns, trumpets, and drums, the angel heads, and angel figures. Furthermore, the French organ has at the console the same brass knobs for slide couplers, the same stop knobs made of hard wood with ivory centers, the same keys of linden wood covered with ebony veneer if they were natural keys, with ivory if they were sharp keys, and the same front faces of the keys as are found in Silbermann's organs. Silbermann's consoles

show the same arrangements everywhere. The lower keys of black ebony have the same semi-circular lines on their faces that are also seen on the keys of the altar picture at Gent, of the year 1432. Bédos also knew red and green ebony, in addition to the black. However, he preferred only the hardest kind of black or "male" ebony for the surface of the keys. Silbermann's upper keys are shorter than our modern ones, and their upper surfaces are several millimeters narrower than their bases. This is the way J. S. Bach wanted them. Adlung, who did not yet know the advantages of curved fingers, preferred longer upper keys. To cover the upper keys, Silbermann used ivory; Bédos, however, used bone. Bone was harder than ivory and did not turn yellow with age.

In the arrangement of his stop knobs, which ran in parallel rows to the left and the right of the organist, Silbermann followed the old, established custom. Their names were written on small pieces of paper in formal Gothic writing, and these papers were placed below the knobs. Many such original register labels have come down to us at Fraureuth, Nassau, Ponitz, Freiberg Cathedral, and elsewhere. Silbermann distributed the stops of each manual on both sides of it. Usually two corresponding rows on each side contained the stops of one manual. Sometimes each vertical row of stop knobs was divided into Oberwerk and Hauptwerk. The pedal stops were usually found at the lower end of each row. Within the row the arrangement from top to bottom was as follows: flue work, mixtures, reeds. An exception was made of the Cornet, which according to French precedent, was placed immediately after the 8′ Principal.

The compass of the large three-manual works of Silbermann is, in the manual, C, D - d^3; in the pedal, C, D - d^1. In smaller organs the two highest tones, that is, $c^3\sharp$ and d^3, are missing. In every case, however, the low C♯ is missing. Silbermann did not forego the C♯ because his temperament on this tone produced a bad "wolf," as many people think, but because the omission of this tone was a generally accepted practice in German and French organ building then. It was exceptional to supply the low C♯, as the Silbermanns did in Strasbourg. The Dresden organ builder, Martini, who was supposed to build the complete lowest octave by order of the organists, Gräbner and Petzold, answered this request by saying that low C, C♯ and D were most unusual in organs. Adlung testifies that the C♯ was not made anywhere, but he recommends that it be built into new organs. From the diagrams in Bédos' work, it can be seen that this raised tone was almost always omitted from smaller organs. The extension of Silbermann's pedal organ to a range of C - c^1 was also a forward step. In the great *Organ School* of Knecht, which appeared between 1795 and 1798, we still read that "the pedal keys in most organs of middle or modern times usually extend to f, or at the most, to g, with some organs including an a, and a very few extending up to c^1."

THE BELLOWS

Point 8 of the instructions to an unnamed Silbermann pupil requires for an organ of from twenty-four to thirty stops, three bellows, in the proportion of 3 1/2 to 4 yards x 2 1/2 to 3 yards. Silbermann also provided three bellows for the organ at Greiz, which has thirty-one stops, and the same number for the organ at St. George's in Rotha, which has only twenty-three stops. The scale of the stops was the determining factor, so that the organ at the Freiberg Cathedral was given seven bellows, although it had only forty-five stops, while the organ of the Catholic Court Church, with forty-seven stops, also required only seven bellows. The work in Freiberg, however, had, as contrasted to the one in Dresden, an additional two large pedal stops: 16′ Subbass and 16′ Octave, which required strong wind. The number of bellows and the relationship of their measurements depended on the space that was available at the site of the organ. The bellows of the

organ at the Catholic Court Church are 1.55 meters by 2.84 meters (5′ 1″ x 9′ 4″) and have an expansion of 41 cm. (16.4″). The ones at the Fraureuth organ have the same measurements. The bellows of Andreas Silbermann was somewhat larger. His thirty-two stops required six bellows of 1.71 meters by 3.42 meters (5′ 7 1/2″ x 11′ 2 1/2″). These are the same measurements which Bendeler demands in his *Organopoeia* (Second edition, 1690). The seven bellows of the Casparini organ at Görlitz are of the same size. Schlick thinks five or six bellows in the proportion of 3.42 meters by .85 meters (5′ 7 1/2″ x 2′ 9 1/2″) are sufficient for an organ of medium size. This length would correspond with that of Silbermann's, however, their breadth would be inadequate. The dimensions of Bédos cannot be used very well for a comparison here because they concern the multi-folded bellows. The capacity of a bellows increases with the size of the opening angle; the expansion of Silbermann's bellows normally was 41 cm. (16.4″). Daniel Silbermann, however, demanded for large works an expansion of at least 51 cm. (20.4″). The bellows have to be made of the finest kind of wood because here the use of poor material would quickly become apparent. According to the instructions of Schlick, boards of fir, at least three inches thick, should be used. Bédos thinks oak boards of 5.35 cm. (2.2″) to be sufficient, even if the bellows have the maximum size of 8 French feet (2.56 meters). Silbermann followed the old German custom and made his bellows of fir wood. This wood was completely soaked in glue, in order to close its pores, and to make it more difficult for worms to get in. Any cracks and knot holes had to be covered with leather and painted with glue two or three times. The leather which joined the folds with the main boards of the bellows, and these in turn with the hinges, was doubled. This explains the use of so much leather. Moreover, leather would also be used to cover up the wind trunk, for the valves, pouches, and elsewhere. Silbermann used in the Freiberg Cathedral organ 218 bleached lamb skins and 14 goat skins. Schlick demands neat's leather, which had to be greased very well so that it would not break. Besides, Silbermann got a considerable quantity of parchment from Dresden, in order to seal the inside of the bellows and wind trunks. Casparini covered his canals with cypress wood, and painted them with his special preservative. Today, the parts in question are either sized with glue — and this is a custom that has been followed since the eleventh century — or they are covered, in accordance with Casparini's practice, with bolus. In order to give the leather greater resistance to constant wear, especially prepared horse or deer sinews, hemp cords, or even strong linen cloth, were glued to the bellows' hinges. The ends of these cords were drilled into the wood. Wooden pegs were driven into these holes and glued. The question of Gottfried Silbermann in the specification of Greiz, "whether the little pegs have been drilled in and nailed to the wood?" refers to this. And so does the question of Daniel Silbermann in his advice at Chemnitz, "whether the bellows are well-drilled?" All of Silbermann's bellows rest on a strong frame, so that repairs are easily made after unscrewing the bellows' valves. Through this high position dust and dirt of the floor cannot as easily get into the bellows, and from there into the pipes. Silbermann used the bellows with a single fold. Known from the beginning of the fifteenth century in England, they were not found until a century later in Germany. The single-fold bellows replaced the multi-fold bellows, which was similar to a blacksmith's bellows, and gave little and uneven wind on account of the irregular holes. We can see from the woodcuts of *Syntagma*, how difficult the task of the bellows operators was, and what an army of blowers a large organ required. In about 1550 Hans Lobsinger, a Nüremburg universal genius, is supposed to have invented the simpler type of bellows, called wedge-bellows, with a single fold. We do not know if the invention was

new in Germany or whether it was only an improvement of an invention that had first been made in England. The eight span-bellows, which Master Hennig from Hildesheim built at St. Blasius at Braunschweig, were evidently an improvement, for they were made "in a special way." Hennig had succeeded in fitting the oak board into its resting position so closely that mice and rats, those dreaded organ destroyers, would try in vain to get to the leather of the bellows. About 1600 the many-folded bellows was probably generally used in France. Mersenne gave a picture of a very complicated form of this bellows, the lantern bellows, with a pulling mechanism. Bédos, who knew the bellows mechanism of French and German organs, recommended to his countrymen the large German bellows with a single fold, which gave more even wind and was more dependable than the small French bellows. However, he did not succeed in destroying the old prejudice against German art. Thus, in France, as well as in England and America, the preference for such bellows has been maintained to this day. The many-folded bellows is usually pulled up. Silbermann expected to derive a great advantage from such a mechanism in the organ at the Freiberg Cathedral, because the distracting noise resulting from operating the bellows by treading on the levers would be avoided. However, pulling the cords with the arm did not work out very well with such large bellows, for in 1738 Silbermann attached stirrups to the end of the ropes, into which the blower stepped, and thus pulled the bellows up with the weight of his body. With this organ Silbermann had used a so-called counter weight, which attracted the especial attention of Kuhnau. Its purpose was to make the movement of the bellows more even. Probably, however, it did not fulfill Silbermann's expectations either; because in later works he used only the "Strebefeder," a long lathe attached to the floor parallel to the bellows, and tied with its free end to the "Pritthebel." Thus, the initial speed of the bellows is increased as it falls together. The load on the bellows which gives the wind the necessary pressure consists in Silbermann's organs of weights. Kuhnau recommended lead weights, which did not react to any external influences. Perhaps Silbermann thought the influence of weather to be negligible. At any rate, bricks were more advantageous because they were cheap, and the weight could easily be adjusted. Even today, we still find in modern organs bellows weights consisting of bricks wrapped in paper. Prætorius reported that the bellows weight was known in German organ building at least as early as the beginning of the sixteenth century.

The exact determination of the wind pressure, however, did not become possible until the invention of the wind gauge. It was used first by its inventor, the organ builder, Förner, 1667, in the organ at the Cathedral at Halle. Of this Förner, Werckmeister informs us he "gave his organs often as much as 45 to 46 degrees wind." [Approximately 4"]. Also, the Martini organ at Halberstadt, where Werckmeister was organist, had this strong wind. But those were exceptions. The French organ builders, the Strasbourg Silbermanns, Casparini and the South Germans generally retained the wind pressures of 28 degrees [approximately 2.5"] or less, in the belief that this would insure the "argentine" sound. Biermann mentions in his *Organopoeia* 30 degrees as a strong wind. The better German organs of the sixteenth and seventeenth centuries, however, frequently had wind pressure of 35 or 36 degrees [approximately 3"]. The large pedal voices and the many reeds needed this higher pressure to insure prompt and reliable speech. For the same reason Gottfried Silbermann used in his organ at Freiberg Cathedral a wind pressure of 41 degrees [3.6"] for the manual and 46 degrees (4") for the pedal, while Kuhnau had expected only 35 degrees. This high wind pressure is not found in the succeeding works of Silbermann. Even in the largest organs, such as the one in the Frauenkirche at

Dresden, it is only 36 degrees, and occasionally, as at Crostau, only 33 degrees [2.9″]. The low wind pressure was sometimes a matter of necessity. The strong organ wind demanded much of the bellows and wind chests. It also affected the key action (touch), so that many an organ builder would gladly forego the advantage of freshness of sound produced by higher pressures. It becomes apparent from the two figures for the wind pressure of the Freiberg Cathedral organ that Silbermann had already undertaken a division of the wind in the main wind trunk.

In most of his smaller works such a division of the wind is not to be found. Because of this and because of the frequently-found corner molding inside wind-trunks, wheezing is likely to occur in most of Silbermann's organs when modern full chords are played. In organ history the brothers Michael and Johann Wagner of Schmiedefeld, in Thuringia, are supposed to have been the actual inventors of the divided wind supply, which they made in 1750. However, Bendeler (*Organopoeia*, Second edition, 1690) recommended a separate pedal bellows, since he had noticed that the basses caused too great a fluctuation. Casparini in Görlitz, Gottfried Silbermann, and Joachim Wagner (in 1720 at St. Mary's in Berlin) transformed this theoretical demand into practice. In France, this separation of the wind had already reached a high degree of perfection in 1760. Bédos knew of such division of the wind in from two to five sections.

Some measurements for the wind mechanisms of Silbermann's organs should be added. The catch-valve opening in the bellows of the organ at Fraureuth is 48 cm. x 35 cm. [19″ x 13.75″]; that of the one in Ponitz, 42 cm. x 34 cm. [16.5″ x 13.4″]. The actual valve moves like wings of a double door on modern hinges. Each wing consists of a small wooden frame, which is covered with leather. The bellows (1.52 meters x 2.78 meters) [4′ 11″ x 9′ 1″] has a rectangular junction pipe that is 35 cm. x 30 cm. x 14 cm. [13.7″ x 11.8″ x 5.5″]. The main wind trunk is about 3 meters [9′ 10″] long and had a cross section of 23 cm. x 23 cm. [9″ x 9″], with a board thickness of 2 cm. [.8″] (Fraureuth).

THE WIND CHEST

The "antechamber" to the actual wind chest is the wind box. According to Daniel Silbermann, it must be high enough to be able to contain a sufficient amount of wind. Silbermann's wind boxes can be opened as in all old slider chest organs. They are shut by the insertion of little pieces of wood, which in Fraureuth are made of fir. Attached to them are hemp cords. Especially in winter, these plugs wrapped in leather are very much swollen. Even if the oaken pegs which serve to secure them are knocked out, it is usually necessary to insert an oak post under one of the hemp cords as a lever, and to open it by force. It is particularly important to make the wind chests, "the heart of the organ," including its parts, the sliders, the pull-downs, et cetera, of the best oak wood. The influence of temperature would be felt with any other kind of wood in the form of injurious expansion and contraction. In addition to the time required to produce a good chest much mathematical work, careful planning, and conscientious labor are necessary. If the organ builder fails in this respect, then the wind will find its own ways! Then the organ howls and squeals! Organ builders have tried from the earliest times to avoid this, and if the chest was not as it should have been, they helped themselves by making holes, either in the chest or in the note channels. These were the famous "Swedish holes" or "Spanish riders" ["bleeding"] which Silbermann and Trost called in Altenberg "Schelmenlocher," i.e. "fool's holes," because they gave clear evidence of the incompetence of the workmen, and took power from the organ.

According to the amount of wind required for each pipe, Silbermann determined the width of his channels. The frame of a Silbermann chest is joined by dovetailing. The pedal chests were usually on the floor. In Ponitz and Fraureuth the Hauptwerk chests are at a height of two meters, [6′ 8″], the Oberwerk chests, on the upper level, at a height of three meters [9′ 10″] above the former. The chests consist of two parts; on the first, the C chest, the pipes go upwards from C, D♯ in whole tones; the D chest from D, E in whole tones upwards. The measurements for the chests of the first manual are, at Ponitz, 102 cm. x 82 cm. [3′4″ x 2′8″]. Those of the second manual 160 cm. x 74 cm. [5′3″ x 2′5″], at Fraureuth for both manuals they are about 91.5 cm. x 87 cm. [3′ x 2′11″].

Silbermann did not used to glue lathes over the channels [to close them, behind the wind box] and construct them in this manner, as most builders of his time did, but he covered the openings of the channels by a board glued over them. This process has been known from the oldest German and French organ building up to our time. The adherents of both methods thought of their own as the most dependable. Thus, Werckmeister found upon inspecting the famous organ at Grüningen that the foundation board had become unglued, and therefore he thought of the lathes as being better. When Scheibe had made a foundation board and a short octave at the St. Paul's organ in Leipiz, he had to make a new chest by the order of Sebastian Bach. Nevertheless, Silbermann used this foundation board, but not out of stubborness, as Adlung leads one to believe in his *Introduction to the Musical Science*, but because his methods were just as dependable as those which were used by the other most important organ builders in Germany. It was quite customary in Germany to cover the top of the wind chest with leather so that through the displacement of the sliders there could be no loss of wind. In France, the under side of the sliders were covered with leather. Silbermann does that also, however, but only with the sliders of the Oberwerk as in Fraureuth. The sliders of the other chests are of oak wood without any covers. They move easily in all of Silbermann's organs. Since the middle of the last century there have been many complaints about the inadequate size of Silbermann's chests and wind trunks. That was the period in which organists who had for the longest time been used to polyphony, began to prefer more modern, homophonic music. With this style of composition, the organs of Gottfried Silbermann do not function as well as those of his relatives in Strasbourg. The requirements of an organ in this respect, during the time of Bach, are explained by Silbermann in this way: If when playing chords in the right hand and passages in the left hand, there is no wavering, the organ is good. Some modern students wish that with all stops and couplers drawn, double chords in sixteen parts could be played constantly! The old-time organ builders should not be envied. Their problem was to build an instrument which, on the one hand, would have wind in sufficient amount and strength, and on the other hand, could be easily played. If the organ builder increased the openings of his valves, in order to increase the quantity of wind flowing into the pipes, then larger valves were necessary, and greater force would be required to depress the keys. Therefore, the organ builders preferred the lesser evil, the wheezing or wavering, which was a generally accepted fault, and they maintained in their organs a light touch.

THE ACTION

Looking inside a Silbermann wind chest, one immediately sees the well-known pouches, of which the leather has in most cases become black and occasionally broken. Through these pouches lead small willow pipes, a feature which Silbermann adopted from French organ building. In Germany, these leather pouches were usually made with a

wooden ring glued to them so that a loop could be attached. Silbermann made a loop on the top of the little pipe, and the S-shaped part of the brass wire was passed through it. This was the wire that actually opened the valve. The valve pallets were, as usual, of leather-covered oak beveled at the edges and hinged with leather. A lathe held the free end of the hinge against the ceiling of the wind chest. When the valve is closed it is pressed against the channel by a spring. The other end of each of these scissors-shaped springs is attached to a comb-like board. It had been well known for some time that long and narrow pallets were best for a light key action. The wire of the valve springs also must not be too strong, in order to avoid thumping with the closing of the valves. Although the touch of the Freiberg Cathedral organ cannot truthfully be likened to that of a clavichord, as Silbermann had stated in his first disposition, it still today can be played in such a way that, in comparison with similar mechanisms, it leaves nothing to be desired.

The valves were connected with other parts of the action by means of the abstracts [stickers]. Daniel Silbermann required that, because of their permanence, they should have parchment at the place where the wires go through them. The manner in which this parchment was attached and, also, the way in which the leather screws were fastened, is characteristic of Silbermann. Since occasionally these abstracts had a length of 2 1/2 meters, as at Ponitz, the influence of weather changes could only be counteracted by selecting the best and most perfectly seasoned wood.

The place in the action of an organ where the motion of the keys is changed to the appropriate direction, either under or over the pallet valves, has from the oldest times been called a roller board. Werckmeister spoke instead of the "bent-hook device." Casparini used, instead of roller boards, roller frames with iron rollers, in order to save space. Silbermann also occasionally used iron rollers for the same reason. However, he attached them to wooden roller boards. In the Rückpositiv chests, the key pushes the abstract down and, therefore, pushes the pallet upward. For this reason, Silbermann called such an action unit a "strechtur" (pushing) as contrasted to "traktur" (pulling). Again, in order to eliminate the influence of weather changes as much as possible, the abstracts were attached with brass screws. The regulation of these screws was the first work Silbermann did at the neglected organ at the Sophienkirche in Dresden, on August 17, 1740.

In addition to the key action, there is also the stop action. This action opens and closes the sliders. They are operated by the sidewise motion of a lever, usually made of iron, and connected through an angle piece with the actual stop knobs. These levers were of considerable length and thickness (Fraureuth: 1.20 meters long and 2 cm. thick [3′11.25″ and .8″]). Their axes were held in a strong, cone-like cup frame of oak. The rods for the sliders of the Oberwerk, which were in some instances 3 meters long, are also sometimes made of wood, and installed so that they cross those of the lower manual. Silbermann seems to have adhered to the principle that iron should be used only if space prohibited the use of a durable wood.

A stop knob controlled the only accessory register of Silbermann organs which today seems obsolete, the tremulant. This device was constructed as a kind of sperrventil, except that the board which bars the wind and is weighted down with lead, is hinged so as to open away from the source of the wind, while the sperrventil is hinged so that it opens toward the in-flowing wind. Although sperrventils were mentioned in the so-called "Organ Treatise" of Hagenau of 1491, documentary evidence of the existence of the tremulant did not appear until a half-century later. It was especially valued at the beginning of the seventeenth century. Esias Compenius described it as a

fine device, which could be used for playing not only on the manuals but also in the pedals. It was emphasized as being of primary importance in the information about the Paulinerorgel at Leipzig by Scheidt. Among the Latin races, the tremulant is highly valued to this day, although many important organists of France as early as 1760 have regarded the tremulant as a "perturber" of the organ. This unfavorable judgment was especially applied to the "tremblant-doux," which Silbermann usually built for his Vox Humana, and which he called "Schwebung." The French also referred to the tremulant as a "vent perdu" because when it was used much wind was lost from the wind trunk. In many Silbermann organs the tremulant was built into the main wind trunk so that all the manual registers could be played with tremolo.. Neither the tremulant nor schwebung of a Silbermann organ is tolerable to the modern ear.

Other accessories of Silbermann's organs are the couplers. In a Silbermann organ we find the following relationship between the point of application of the force (where the finger presses the key), the load point (where the stickers are attached), and the fulcrum (the hinged immovable end of the key). In the Hauptwerk the keys are divided in the middle so that the abstracts are attached at a distance of 29 cm. [11.4"] from either end. In the Oberwerk the abstracts are attached 22 cm. from the point of finger contact, and 25 cm. from the hinged end. In this matter Silbermann followed the method recommended by Schlick, and after him by Bédos, of putting the load point (the joining of the abstract) in the center of the key, one-half of the distance between the two ends. In this way he gained the advantage of a light touch, combined with the shortest possible key. In his first organs Silbermann used the block coupler. It required special care in its treatment, since it could not be drawn while playing. Also, the weather very often affected the blocks adversely. Silbermann's later organs have a superior type of manual coupler, the fork coupler. On the extension of each upper manual key there is a piece of wood cut in the form of a comb, which pushes under a leathered screw of the abstract of the Hauptwerk when coupled. The key of the Hauptwerk then pulls down the corresponding key of the Oberwerk. Adlung became acquainted with and noted the value of this coupler in the work of Hildebrand at Naumberg. Silbermann reverted to an old way of coupling, mentioned by Werckmeister, in his pedal coupler. In his smaller works he built it so as to be permanently on. His manual chests usually had two sections, to one of which led the key action of the manuals, and the other had so-called "separate" valves. The abstracts of these separate valves were connected with the pedal action while the pedal coupler was in operation. By means of Silbermann's Bass-ventil the coupling could be stopped.

THE PIPES

The materials out of which Silbermann built his organ stops were as follows:

1. Tin, usually English tin. Of pure tin he made the flue work; 16′ and 8′ Principal (also Unda Maris), 4′ Prästant or Octave, 2′ Superoctave or Doublette, 2 2/3′ Quinta, 1 1/3′ Larigot, 1 3/5′ Tertia, 4/5′ Sesquialtera, 1′ Sufflet or Flageolet, 16′ and 8′ Quintaden, 8′ Viola di Gamba or 8′ and 4′ Spielflöte, IV Mixtur, VI Plein Jeu (Pedal), IV and V Cornet, V Echo Cornet, II and III Cymbel; also the reed voices, 16′ Fagotte, 16′ Posaunenbass or Bombarde, 8′ Trompette (both manual and pedal), 8′ Chalumeaux, 8′ Krummhorn, 8′ Vox Humana, 4′ Claron.

2. Completely of metal (lead and tin) he made: 8′ Rohrflöte, 8′ Gedackt (Koppel), 4′ Flöte, 2 2/3′ Nassat (occasionally 1 1/3′).

3. Entirely of wood (pine) he made: 32′ Untersatz, 16′ Oktavbass, 16′ Principalbass, 16′ Subbass.

4. Of combinations of wood and metal he made: the lowest pipes of 16′ Bordun, 8′ Gedackt, 8′ Rohrflöte, and sometimes C, D, D♯, E of the 8′ Prinzipal. 16′ Posaunenbass had metal blocks and wooden resonators. 8′ Trompete and 4′ Clairon had tin resonators. The tongues and shallots were of brass.

Silbermann preferred tin both because of its favorable influence on tone and because of its durability. English tin was at that time considered best. Silbermann used this precious material almost exclusively. Adlung emphasized the rarity of its use because of its great cost. "We have our own mountain tin," he said. (Meaning that he should use German tin.) The council of Freiberg had expected Silbermann to use tin from nearby Altenburg. But since that tin contained iron, which would appear as spots on the tin plates and later rust, thus ruining the pipe, he refrained from using local tin in all of his later organs. He must have added some marcasite to the English tin, in order to achieve whiteness and hardness. A long-established custom in German organ building was that of hammering the tin plates. It was, however, not practiced by all builders in Silbermann's time. Kuhnau particularly emphasized this feature of Silbermann's work in his advice at Freiberg. Silbermann himself spoke of it as a "wonderful method." This hammering of the plates would serve, he said, "to make the leaves compact." The specific gravity of tin is actually changed by hammering or rolling. The latter method was suggested by Professor Töpfer instead of hammering. With this change in specific gravity the quality of tone produced by the pipe is changed. Certain French organ builders who hammered the tin of all pipes did so for the additional purpose of eliminating the impressions made by the linen cloth when the metal was poured. Tin, however, was rare in eigthteenth-century French organs. Bédos recommended tin as a preferred metal for pipes because he thought that it would be economical in the long run. Lead, he said, was an irregular, unreliable material. A tin stop also would give a forceful, fine, sharp and pleasing tone. Since he said that no lead was used in organs in Germany any more, and that even the pipe feet were made of tin, he must have been thinking of the organs of Silbermann. Such use of tin, however, was exceptional even in German organ building. After the time of Silbermann the hardening of the tin plates with wooden hammers, at least for the Principal stops, was emphasized over and over again, because through this practice the pipes would be given an "excellently definite, strong and clear tone." One should be careful, however, because the plates could easily become uneven or even broken.

The price of a hundredweight of tin in the year 1710 was, according to Silbermann's own statement, 24 1/2 thaler. When Silbermann made his estimate for the work in Zittau he planned to use 75 hundredweight, at 29 to 30 thaler a hundredweight. There were two ways of molding tin plate in Silbermann's time. The older builders used the inclined molding frames which had to be covered with a soft woolen material such as flannel. From the statement about material for the Cathedral organ at Freiberg and for the organ at the Frauenkirche in Dresden, it is apparent that Silbermann used this old method. The material, in both cases fustian, had to be folded double, and was attached to an oak frame with nails. The oak frame held the material stretched. The porous cloth served the purpose of permitting the escape of gases emanating from the molten metal during cooling, and also of releasing the solidifying plates as they cooled, without sticking. Because of contraction these plates would have broken on a more solid material. More progressive organ builders, in both Germany and France, used a horizontal casting bench covered with linen. Casparini was apparently the first one to do this in Germany. Adlung reported to Boxberg that Casparini poured metal on linen which had been painted

with a material which he, himself, had invented. This way of molding, he said, was not quite as fast as molding on sand. However, he (Boxberg) had seen 38 hundredweight of tin for large pedal pipes being molded in a single day without the linen being damaged or torn. From the continuation of this same quotation we learn that the technique of molding on fine sand also had its adherents, although it was very old fashioned. With this method, however, it frequently happened that grains of sand would stick to the tin plate, and this would damage tools when the metal was planed, and sometimes even made holes in the plates. Because of this, a method of molding metal on ashes was employed for a while. When metal was molded on sand the first plates often had blisters. For this reason, Bendeler, Werckmeister's friend, suggested the use of hot sand. In his advice at Freiberg, Kuhnau especially commended Silbermann's molding the leaves of metal for the pipes in "sizable pieces," and in the examination protocol of Rotha, he praised the pipes which were made of thick, "well-hammered, good tin sheets," and he especially commended Silbermann's use of tin for caps and feet, parts which were usually made of common metal. In his later works Silbermann also used tin for the individual pipe conductors where they were set off the chests. If pipe walls were too thin the tone was unsteady. If pipes were made of poor metal they sometimes bent and folded into wrinkles around the mouth because of their inability to support their own weight. If one were to look inside an organ in which the pipes were made of heavy, soft metal, one would see them bending around and over one another, as though, according to Kuhnau, "drunken peasants were holding a carnival dance." If metal plates were too short, some organ builders did not hesitate soldering lengths of metal together so that the pipe consisted of several sections attached to each other. This, however, was frowned upon.

The measurements for lengths, circumferences, mouth widths, thickness of languids, and of all individual pipe parts are included under the general heading, "scaling." Silbermann mentioned nineteen such metal and tin scales or measuring rules for cutting the metal sheets to be rolled around mandrels in making pipes.

Today, the lengths of a series of pipes included within an octave are determined by equal temperament. Formerly, the progression varied. The circumferences of an entire set of pipes are determined with reference to the type of tone required of them. However, even within a single stop the proportion between length and circumference varies from bass to treble somewhat irregularly. In the lower register, broad scales produced grave and magnificent tone quality. Narrow pipes produced a soft and lovely sound in the treble. The small treble pipes were made to balance with the basses by gradually increasing, relatively, their diameters in the upper octaves. The measurement of the cut-up, the thickness of the languid, and the mouth width itself, were varied in exact proportion with the circumference of the pipe. Bédos reported the general custom that Principals should be cut up one-fifth of the mouth width. Silbermann, Trost and Trampeli gave their pipes a cut-up one-fourth of the mouth width, while they cut up their Gedackts as much as one-third of the mouth width. These various measurements which were frequently as close as small fractions of a millimeter, were determined by compasses. Among Silbermann's effects there were found, in addition to a complete set of mathematical instruments, a "musical proportional compass and an iron hair compass." An open compass also appears in the middle field of two seals used by Gottfried Silbermann. These make us realize the importance which Silbermann attributed to the art of fine measurement in organ building.

Before the different parts of the pipe were soldered together those to be used in the case were polished. This is a very old custom, of which an example is to be seen in the

shining rows of Principals in the altar painting at Gent, dating from 1432. The "Spanish white" used by Silbermann for polishing was the same as modern chalk. It was also used as a protective coating during the soldering. For this soldering the soldering iron itself was first dipped into colophony powder. Silbermann's mastery of soldering and polishing, especially of Principals, was instantly recognized by Kuhnau. As one can see from Werckmeister's *Orgelprobe*, the soldering of organ pipes was still in a bad state in about 1700. "Indiligent" soldering was frequently found around the languid. Many made the difficult and time-consuming soldering of the languid easy for themselves by soldering only half way around. Daniel Silbermann also knew of the tricks practiced by bad organ builders, some of whom filled small holes that had been left open by mistake with wax. On the other hand, organ builders even today still admire the clean soldering of Silbermann's organ pipes. This is especially noticeable around the mouths. The upper lip protrudes slightly beyond the lower one. Ladegast, an indirect Silbermann pupil, used this method and believed that it gave assurance that a pipe, if otherwise well-built, could be made to speak promptly. By adjusting the position of the languid in relation to the lower lip, the air may be made to move outward so that it is caught by the protruding upper lip. In a drawing of a case work pipe which Bédos observed in an organ built by the Flemish builder, Pöncher, in 1623 at Béziers, Languedoc, the same protruding and large upper lip can be seen. This pipe also has a sort of harmonic bridge, and was covered with metal lacquer, which gave it a shiny appearance. Andreas Silbermann also used lacquer for tin pipes. Probably this custom was regarded as a means of conservation.

Wood played a subordinate role in Silbermann's organ building. He used it for the low pitch pedal stops and for the lowest notes of a few manual stops, but only for reasons of economy. This factor was decisive in the Frauenkirche at Dresden. For it he needed 300 thaler worth of fir wood for the "bellows and pipes." He spent the same amount of money on oak, maple, pear and linden wood. Of this, too, a considerable amount was probably used for pipes and pipe parts. The 16′ Holzprinzipal had lips of pear wood. Only the very best wood which was "pure, well-grown, and without knots," found favor in Silbermann's eyes. It had to be felled in the late fall, had to dry several years in the open air, and had to be turned frequently while drying. The pipes made of such well-seasoned wood were coated with glue for sizing. With that Silbermann intended to prevent destruction by worms, and also to achieve a brighter tone. Daniel Silbermann demands in his Chemnitz professional opinion that all wooden pipes having knots be coated two or three times with red glue and be leathered at the knot holes. The caps in Silbermann's stopped pipes are glued on, the stoppers of his wooden Gedackts are immovably fastened. Thus, Silbermann demonstrates again his attachment to old ways. This, however, is justifiable for a master like Silbermann. In wooden pipes every thing depends on correct measurements. With tin pipes there are many possibilities for adjustments. All tuning devices, especially of the Gedackts, are time consuming, expensive and uncertain. That Silbermann's Gedackts were splendidly successful despite his old methods, is proved by those examples which still exist. In his appreciation of tin and metal Silbermann was also a traditionalist. Schlick speaks of wood pipes as a curiosity. With Praetorius, the idea seems to be rather unusual that wood could produce a pleasant sound: "the wooden, but very magnificent organ made by Esias Compenius in 1612 at Hessen in the castle." The "strange loveliness" of a wooden work is mentioned by Kaspar Kerll in 1639. After the Thirty Years War wood became more common as an organ material, particularly in small communities. Bendeler treats the wooden pipe thoroughly.

We have already mentioned the importance of scaling for sound, and the great

carelessness which was prevalent in this matter. Since the research of Töpfer, scaling has had some scientific basis. According to him, the proportion of the cross-sections of pipes an octave apart should be as one to the square root of eight. The half-circumference of a particular pipe would therefore occur at the interval of a tenth above it [on the seventeenth pipe]. Half the circumference of a C is therefore to be found on the second E above it. Silbermann and his pupils, particularly Hildebrand, had, however, a special proportion of the octave cross-section for each type of stop. In Principals, including mutations and mixtures, the half-circumference fell on the ninth [fifthteenth pipe]. In the Gedackts, it fell on the eleventh [eighteenth pipe]. In conical stops, such as Spitzflute and Viola di Gamba, it fell on the twelfth [twentieth pipe]. Bédos and Andreas Silbermann employed a somewhat wider scale for the lowest octave. Silbermann's progression was irregular in the higher ranges. He adhered to a regular progression as high as the 1′ pipe, but his scale gradually grew considerably wider above this point. This is probably one of the reasons why his mixtures have a beautiful, silver-like splendor, which distinguishes them favorably from later mixtures that were sometimes raw and screaming. An unintentional change of scale occurred when some of these organs were tuned lower. With the shortening of the pipes, the scale was widened. In relation to the new scale, the cut-up was then too high and required more wind. If the difference in pitch was only as a half-tone, as in the case of almost all of Silbermann's organs that have been re-tuned, a transposition of each pipe to the next higher pipe hole could be effected, provided no other changes in the pipe were made. In this manner many Silbermann organs have been brought to normal pitch, as for example those at Oederan, the Frauenkirche in Dresden, St. Peter's in Freiberg, and others.

Silbermann used brass for the shallots and tongues of his reed pipes. He also used brass for certain parts of the action, such as the valve springs, the wires and screws of the abstracts, the guide pins for both valves and keys. It is more durable than iron, and can be melted more readily than copper, so that it can easily be made into wire. "With the reed stops, not only the resonators, but also the shallots, must decrease in a fixed proportion." in the words of the introduction to the Dresden manuscript. At the Freiberg Cathedral organ Silbermann built a Posaunenbass with larger tongues after the rest of the organ had been completed, and it was especially designated as Silbermann's own invention. The scales of the Posaune, Trompete and Clarin of Silbermann, as well as of Bédos, are all in the same progression, and proceed from the same starting point. In France, however, the reed voices were usually scaled differently for the manuals.

Silbermann placed his pipes in the Prospect, on the chests, and on special pipe benches. The large tin Principal pipes in the Prospect had their own conductors, smaller ones had a common wind supply. The lowest wooden pipes of the 8′ Principal, which were used in some of Silbermann's organs, were located usually right in back of the Prospect on a special pipe bench. They were usually painted gray, so that they would not reflect light. The stops in the organ at Ponitz are arranged in the following order from the Prospect backwards:

8′ Viola di Gamba, 16′ Bordun, whose sixteen lowest pipes, of wood, are placed on special shelves at the sides of the organ, also behind the right and left side of the Prospect, 4′ Octava, V Cornet, 8′ Rohrflöte, 4′ Spitzflöte, 3′ Quinta, 2′ Oktava, 1 3/5′ Tertia, IV Mixtur.

With this arrangement, characteristic of most of Silbermann's organs, one of Bédos' requirements is fulfilled, whereby the pipes should increase from the back to the front, as in an amphitheatre. The mixtures stood always at the end, only the Cornet being

placed as far to the front as possible, frequently right behind the 8' stops, if not on a special shelf above the other pipes. There are two reeds, and these voices, which need so much care, were placed in the last row. Since two pipes standing at the same pitch very often interfere with each other, Silbermann occasionally arranged them in staggered positions on the chest. This also saves space. In order to keep the smaller pipes in place, Silbermann used the same racks of linden wood which had been used for a long time. In Fraureuth, all wooden pipes of Silbermann's manual chests stand on special shelves; the wooden pedal stops, however, are immediately on their own chests.

The pitch of most of Silbermann's organs was almost a half-tone higher than the usual pitch of the present day. It was the so-called Chorton. The Dresden organs and the organ in St. John's at Zittau were in Kammerton. In France the choir tone (tone chapelle) was fixed in about the middle of the eighteenth century. However, the opera tone (Opernton) varied and was sometimes a quarter or a half-tone higher or lower than the choir tone. The Strasbourg Silbermanns tuned their organs in this opera tone, which in Alsace was a half-tone lower than the choir tone. Also the chamber tone organs of Gottfried Silbermann somewhat differed from the usual chamber tone pitch. The organ of the Catholic Court Church in Dresden was almost one-quarter tone lower than the other two chamber tone organs of Silbermann. Silbermann well knew what it meant to build a large organ in chamber tone. The one additional lower note required for its pipes more tin than most of the rest of the organ combined. That is why he was reluctant to build a chamber tone organ for the Dresden-Friedrichstadt. Zacharius Hildebrand, who with his son, built the organ of the Dreikönigskirche in Dresden-Neustadt at a lower pitch, found himself in serious financial difficulties as the result of this project, together with various other mishaps. Because of the trouble he experienced in this organ he died before it was finished. It is much to Silbermann's credit that he was the first to build organs in Kammerton. The organ of the Liebfrauenkirche in Halle, built by Contius in 1716, had a transposing device. According to Schlick, this was an old-time invention. It had the great disadvantage that unequal temperament caused the "organ wolf" to move into a frequently-used fifth and therefore made the tuning unbearable.

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